

This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Minor, Municipal permit. The discharge results from the operation of a 0.45 MGD wastewater treatment plant. The permit also contains flow tiers of 0.075, 0.150, and 0.250 MGD. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS and updating permit language, as appropriate, to reflect current boilerplate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260-00 et seq.

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|--|--|-------------------------------------|-----------------|
| 1. Facility Name and Mailing Address: | Boston Water & Sewer STP
2301 Wyoming Ave NW
Washington DC 20008 | SIC Code: | 4952 WWTP |
| Facility Location: | 1 mile SSW of the intersection of Routes 522 and 707 | County: | Culpeper |
| Facility Contact Name: | Don Hearl, ESS | Telephone Number: | (540) 825-6660 |
| 2. Permit No.: | VA0088749 | Expiration Date of previous permit: | 12/7/2010 |
| Other VPDES Permits associated with this facility:
VAN020111 | | | |
| Other Permits associated with this facility:
None | | | |
| E2/E3/E4 Status: | Not Applicable | | |
| 3. Owner Name: | Boston Water & Sewer STP | | |
| Owner Contact>Title: | Edward O'Brien, President | Telephone Number: | (202) 234-1567 |
| 4. Application Complete Date: | May 17, 2010 | | |
| Permit Drafted By: | Alison Thompson | Date Drafted: | August 10, 2010 |
| Draft Permit Reviewed By: | Joan Crowther | Date Reviewed: | August 13, 2010 |
| Public Comment Period : | Start Date: 10/21/2010 | End Date: | 11/20/2010 |
| 5. Receiving Waters Information: See Attachment 1 for the Flow Frequency Determination | | | |

Receiving Stream Name :	Hazel River	River Mile:	3-HAZ029.30
Drainage Area at Outfall:	59.1 sq.mi.	Subbasin:	None
Stream Basin:	Rappahannock	Stream Class:	III
Section:	4	Waterbody ID:	VAN-E04R
Special Standards:	None	7Q10 Low Flow:	0.78 MGD (June-Nov)
7Q10 Low Flow:	0.78 MGD (June-Nov)	7Q10 High Flow:	10 MGD (Dec-May)
1Q10 Low Flow:	0.53 MGD (June-Nov)	1Q10 High Flow:	8.5 MGD (Dec-May)
Harmonic Mean Flow:	12 MGD	30Q10 High Flow:	13.8 MGD (Dec-May)
303(d) Listed:	No	30Q5 Flow:	2.7 MGD
TMDL Approved:	Yes (downstream)	30Q10 Flow:	1.6 MGD
Date TMDL Approved:	1/23/08 Bacteria		

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- | | |
|---|---|
| <input checked="" type="checkbox"/> State Water Control Law | <input checked="" type="checkbox"/> EPA Guidelines |
| <input checked="" type="checkbox"/> Clean Water Act | <input checked="" type="checkbox"/> Water Quality Standards |
| <input checked="" type="checkbox"/> VPDES Permit Regulation | <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> EPA NPDES Regulation | |

7. Licensed Operator Requirements: Class II

8. Reliability Class: Class I

9. Permit Characterization:

<input checked="" type="checkbox"/> Private	Effluent Limited	Possible Interstate Effect
<input type="checkbox"/> Federal	Water Quality Limited	Compliance Schedule Required
<input type="checkbox"/> State	Toxics Monitoring Program Required	Interim Limits in Permit
<input checked="" type="checkbox"/> PVOTW	Pretreatment Program Required	Interim Limits in Other Document
<input type="checkbox"/> TMDL		

10. Wastewater Sources and Treatment Description:

The proposed treatment for this STP is an activated sludge process for nitrification (Sequencing Batch Reactor units), followed by chemical addition, filtration, and ultraviolet disinfection (Attachment 2). This proposed facility would replace the existing 0.015 MGD facility that discharges under VPDES permit VA0065358. According to the application, the system will be designed in a modular format so that each flow increase can be done by adding new process units. Effluent will be either be discharged directly to the Hazel River or to an unnamed tributary to the Hazel River.

TABLE 1 – Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude and Longitude
001	Domestic and/or Commercial	See Item 10 above.	0.075, 0.15, 0.25, and 0.45 MGD	38° 31' 30" N 78° 08' 16" W

See Attachment 3 for (Woodville, DEQ #197C and Castleton, DEQ #197D) topographic map.

11. Sludge Treatment and Disposal Methods:

According to the application, sludge disposal will depend on the design flow. Initially, sludge will be sent to an aerobic digester and hauled to an approved receiving facility. In the later phases, aerobic digestion will be followed by dewatering with a plate and frame pressure filter. Final disposal will be either land application or approved landfill.

12. Discharges, Intakes, Monitoring Stations, Other Items in Vicinity of Discharge

TABLE 2

3-HAZ042.43	VADEQ Ambient Water Quality Monitoring Station upstream on the Hazel River at Route 600 in Rappahannock County.
3-HAZ032.54	VADEQ Ambient Water Quality Monitoring Station upstream on the Hazel River at the Route 644 bridge in Rappahannock County.
3-HAZ026.16	VADEQ Ambient Water Quality Monitoring Station downstream on the Hazel River at Route 522 in Culpeper County.
3-HAZ018.29	VADEQ Ambient Water Quality Monitoring Station downstream on the Hazel River at Route 729 in Culpeper County.
3-HAZ009.58	VADEQ Ambient Water Quality Monitoring Station downstream on the Hazel River at the Route 229 bridge in Culpeper County.
XDH0.08	VA0065358 Boston Water & Sewer WWTP is the current facility that discharges to an unnamed tributary to the Hazel River upstream of this proposed facility. This discharge will be eliminated when the new facility goes online (See Section 21.).

13. Material Storage:

The facility is not built and there are no chemicals stored at the site.

14. Site Inspection:

Since the facility is not built, no site inspection was performed. Alison Thompson inspected the Hazel River for the existing Boston Water & Sewer STP on July 10, 2003; the photos of the Hazel River from this inspection are included in Attachment 4. Once construction commences and an outfall structure is in place, another stream inspection will be completed.

15. Receiving Stream Water Quality and Water Quality Standards:**a) Ambient Water Quality Data**

The nearest downstream DEQ monitoring station with ambient water quality data is Station 3-HAZ026.16, located on the Hazel River at the Route 522 bridge crossing. Station 3-HAZ026.16 lies within Assessment Unit VAN-E04_HAZ01C06, which extends from the confluence with the Hughes River, and continues downstream until the confluence with Devils Run. Station 3-HAZ026.16 is located approximately 2.1 rivermiles downstream from the proposed outfall of VA0088749. *E. coli* monitoring find a bacterial impairment, resulting in an impaired classification for the recreation use. The aquatic life use is considered fully supporting. Wildlife and fish consumption were not assessed.

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2008 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include the *Chesapeake Bay Watershed Nutrient Credit Exchange Program*. This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

The full planning statement is located in Attachment 5.

b) Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Hazel River is located within Section 4 of the Rappahannock River Basin, and classified as a Class III water.

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32°C, and maintain a pH of 6.0-9.0 standard units (S.U.).

Attachments 6, 7, 8, and 9 details other water quality criteria applicable to the receiving stream.

Ammonia:

Staff has reviewed the temperature and pH assumptions used for the ammonia criteria development from the current VPDES permit. Staff's best professional judgment is that the assumptions do not need to be updated. The fresh water, aquatic life Water Quality Criteria for Ammonia are dependent on the instream temperature and pH. The 90th percentile temperature and pH values are used because they best represent the critical design conditions of the receiving stream. Ambient water quality data from 2000 to 2005 at station 3-HAZ018.29 were available from DEQ ambient data and are presented as part of Attachment 6.

The ammonia criteria for each flow tier are presented in Attachment 6 (0.075-MGD), Attachment 7 (0.15-MGD), Attachment 8 (0.25-MGD), and Attachment 9 (0.45-MGD).

Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/l calcium carbonate). DEQ ambient monitoring data from January 2000 to May 2005 at station 3-HAZ018.29 indicated an average total hardness value of 15.9 mg/L at station 3-HAZ018.29. Current staff guidance states that regardless of the ambient data, the minimum hardness value used to determine Water Quality Criteria shall not be less than 25 mg/L. Therefore, the criteria for each flow tier in Attachments 6, 7, 8, and 9 are based on the default value of 25 mg/L.

Bacteria Criteria: The Virginia Water Quality Standards (9VAC25-260-170 A.) states that the following criteria shall apply to protect primary recreational uses in surface waters:

- 1) *E. coli* bacteria per 100 ml of water shall not exceed a monthly geometric mean of the following:

	Geometric Mean ¹
Freshwater <i>E. coli</i> (N/100 ml)	126

¹For a minimum of four weekly samples [taken during any calendar month].

- c) **Receiving Stream Special Standards**

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Hazel River, is located within Section 4 of the Rappahannock River Basin. This section has not been designated with a special standard.

- d) **Threatened or Endangered Species**

The Virginia DGIF Fish and Wildlife Information System Database was searched on August 10, 2010, for records to determine if there are threatened or endangered species in the vicinity of the discharge. No threatened or endangered species were identified. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and therefore, protect the threatened and endangered species found near the discharge. A copy of the search has been placed in the reissuance file.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream was classified as Tier 2 during the last three reissuances based on a review of ambient water quality monitoring data for toxic parameters. A review of the current ambient monitoring data provides no basis to change the determination; therefore, the Hazel River will again be classified as a Tier 2 waterbody. No significant degradation to the existing water quality will be allowed. In accordance with current DEQ guidance, no significant lowering of the water quality is to occur where permit limits are based on the following:

- The dissolved oxygen in the receiving stream is not lowered more than 0.2 mg/L from the existing levels;
- The pH of the receiving stream is maintained within the range 6.0 to 9.0 s.u.;
- There is 100% compliance with all temperature criteria applicable to the receiving stream;
- No more than 25% of the unused assimilative capacity is allowed for toxic criteria established for the protection of aquatic life; and
- No more than 10% of the unused assimilative capacity is allocated for criteria for the protection of human health.

Antidegradation baselines are set for chlorine and ammonia, two pollutants in the effluent that have a reasonable potential to violate water quality criteria.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLA) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a) **Effluent Screening:**

This is a proposed discharge and no effluent data exists for review and evaluation. A Waste Load Allocation analysis will be performed for parameters that are presumed to be present above quantifiable levels.

b) **Mixing Zones and Wasteload Allocations (WLAs):**

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$\text{WLA} = \frac{C_o [Q_e + (f)(Q_s)] - [(C_s)(f)(Q_s)]}{Q_e}$$

Where:	WLA	= Wasteload allocation
	C _o	= In-stream water quality criteria
	Q _e	= Design flow
	f	= Decimal fraction of critical flow from mixing evaluation
	Q _s	= Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; 30Q10 for ammonia aquatic life criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
	C _s	= Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.

- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).
- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this will be a WWTP treating sewage and total residual chlorine may be present since chlorine may be used for disinfection.

Antidegradation Wasteload Allocations (AWLAs).

Since the receiving stream has been determined to be a Tier II water, staff must also determine antidegradation wasteload allocations (AWLAs). The steady state complete mix equation is used substituting the antidegradation baseline (C_b) for the in-stream water quality criteria (C_o):

$$\text{AWLA} = \frac{C_b (Q_e + Q_s) - (C_s)(Q_s)}{Q_e}$$

Where:	AWLA	= Antidegradation-based wasteload allocation
	C_b	= In-stream antidegradation baseline concentration
	Q_e	= Design flow
	Q_s	= Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; and 30Q5 for non-carcinogen human health criteria)
	C_s	= Mean background concentration of parameter in the receiving stream.

Calculated AWLAs for the pollutants noted in b. above are presented in Attachments 6, 7, 8, and 9.

c) Effluent Limitations Toxic Pollutants, Outfall 001-

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1) Ammonia as N/TKN:

Staff calculated the WLAs and antidegradation WLAs for ammonia using the updated flow data; they are presented in Attachments 6-9. In accordance with current DEQ guidance, staff used a default data point of 9.0 mg/L and the most stringent WLAs to determine the need for ammonia limits at each of the flow tiers. All statistical analysis are presented in Attachment 10.

0.075 MGD Flow Tier:

The statistical analysis indicates the need for a monthly average ammonia limit of 12 mg/L during the June-November period. In lieu of an ammonia limit, a TKN limit of 3.0 mg/L will be applied for the June-November period. This TKN concentration assumes that the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that ammonia is completely removed when the 3.0 mg/L TKN limit is met. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average.

The analysis shows that no ammonia limit is needed for the December-May period. A monthly average TKN limit of 10 mg/L is necessary to protect the dissolved oxygen of the stream. See Fact Sheet Section 17.d and Attachment 12 for more details.

0.15 MGD Flow Tier:

The statistical analysis indicates the need for a monthly average ammonia limit of 5.0 mg/L during the June-November period. In lieu of an ammonia limit, a TKN limit of 3.0 mg/L will be applied for the June-November period. This TKN concentration assumes that the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that ammonia is completely removed when the 3.0 mg/L TKN limit is met. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average.

The analysis shows that no ammonia limit is needed for the December-May period. A monthly average TKN limit of 10 mg/L is necessary to protect the dissolved oxygen of the stream. See Fact Sheet Section 17.d and Attachment 12 for more details.

0.25 MGD Flow Tier:

The statistical analysis indicates the need for a monthly average ammonia limit of 3.1 mg/L during the June-November period. In lieu of an ammonia limit, a TKN limit of 3.0 mg/L will be applied for the June-November period. This TKN concentration assumes that the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that ammonia is completely removed when the 3.0 mg/L TKN limit is met. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average.

The analysis shows that no ammonia limit is needed for the December-May period. A monthly average TKN limit of 10 mg/L is necessary to protect the dissolved oxygen of the stream. See Fact Sheet Section 17.d and Attachment 12 for more details.

0.45 MGD Flow Tier:

The statistical analysis indicates the need for a monthly average ammonia limit of 2.0 mg/L during the June-November period. In lieu of an ammonia limit, a TKN limit of 3.0 mg/L will be applied for the June-November period. This TKN concentration assumes that the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that ammonia is completely removed when the 3.0 mg/L TKN limit is met. The weekly average limit will be 4.5 mg/L based on a multiplier of 1.5 times the monthly average. In addition, it is staff's best professional judgment that the annual average Total Nitrogen concentration limits discussed in Section 17.e. will further protect the in-stream Water Quality Standards.

The analysis shows that no ammonia limit is needed for the December-May period. A monthly average TKN limit of 10 mg/L is necessary to protect the dissolved oxygen of the stream. See Fact Sheet Section 17.d and Attachment 12 for more details.

2) Total Residual Chlorine:

Chlorine may be used for disinfection and could potentially be in the discharge. Staff calculated WLAs and AWLAs for TRC using the updated flow frequency data in Attachment 1 and the updated WLAs are found in Attachments 6-9. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. The monthly average concentrations and the weekly average limits for each flow tier are presented in Attachment 11.

3) Metals/Organics:

The facility is not built so there is no data to evaluate. The facility shall be required to perform Water Quality Criteria Monitoring once it commences discharge. The need for limits shall be evaluated with the next reissuance.

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), biochemical oxygen demand-5 day (BOD_5), carbonaceous biochemical oxygen demand-5 day ($CBOD_5$), total suspended solids (TSS), total kjeldahl nitrogen (TKN), and pH limitations are proposed.

Regional Modeling System Version 4.0

Since the low flow 7Q10 critical flow in the Hazel River did not change with the flow update, the Regional Dissolved Oxygen Model was not rerun with this reissuance. DEQ ran the Regional Dissolved Oxygen Model to determine the seasonal limitations for $CBOD_5$, dissolved oxygen, and TKN with the 2005 reissuance. The results of the model runs are found in Attachment 12. The model contained three segments since there are two tributaries that enter the Hazel River downstream of the outfall location. The model used is a steady state stream D.O. model based on the belief that the discharge is continuous in nature. The steady state stream D.O. model predicts the dissolved oxygen conditions in the receiving stream downstream of the discharge.

The model was run for each of the flow tiers for the low flow (June through November) period. For all flow tiers, a TKN limit of 3.0 mg/L was used. A TKN limit of 3.0 mg/L assumes that most of the remaining nitrogen is in the form of refractory organic compounds that will not be easily oxidized and that almost all the ammonia is removed when the 3.0 mg/L TKN limit is met. For the 0.075 MGD flow, a $cBOD_5$ limit of 5 mg/L and a D.O. limit of 6.0 mg/L are protective of the antidegradation dissolved oxygen requirement. For the 0.15 and 0.25 MGD tiers, a $cBOD_5$ limit of 5 mg/L and a D.O. limit of 6.8 mg/L are necessary. During the low flow period at the 0.45 MGD flow, a TKN limit of 3.0 mg/L, a Dissolved Oxygen minimum of 7.2 mg/L, and a $CBOD_5$ monthly average limit of 3 mg/L are necessary to protect the antidegradation dissolved oxygen requirement.

The model was run at the 0.45 MGD flow tier for the high flow period (December through May), a TKN limit of 10.0 mg/L, a Dissolved Oxygen minimum of 6.0 mg/L, and a $cBOD_5$ limit of 30 mg/L. It is staff's best professional opinion that since these limitations are protective of the water quality standards at the highest flow tier, they will also be protective at the lower flow tiers. The model was run with a $cBOD_5$ of 30 mg/L, but a BOD limit of 30 mg/L was placed in the permit. 40 CFR Part 133 states that a $cBOD_5$ of 25 is equivalent to a BOD of 30 mg/L.

It is staff's practice to equate the Total Suspended Solids limits with the BOD_5 or $CBOD_5$ limits. TSS limits are established to equal $CBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. There are three regulations that necessitate the inclusion of nutrient limitations:

- 9VAC25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires new or expanding discharges with design flows of ≥ 0.04 mgd to treat for TN and TP to either BNR levels (TN = 8 mg/l; TP = 1.0 mg/l) or SOA levels (TN = 3.0 mg/l and TP = 0.3 mg/l).
- 9VAC25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of ≥ 0.5 mgd above the fall line and ≥ 0.1 mgd below the fall line. This regulation limits the total nitrogen and total phosphorus mass loadings from these discharges.
- 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* became effective January 1, 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN020111.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820.

Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit. Concentrations are based on concentrations set forth in 9VAC25-40.

f) Effluent Limitations and Monitoring Summary.

The effluent limitations are presented in the following table. Limits were established for Flow, C BOD₅, BOD₅, Total Suspended Solids, Ammonia as N, TKN, pH, Dissolved Oxygen, Total Residual Chlorine, Total Nitrogen and Total Phosphorus.

The limit for Total Suspended Solids is based on Best Professional Judgement.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/l), with the flow values (in MGD) and a conversion factor of 3.785.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for BOD/CBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19.a Effluent Limitations/Monitoring Requirements:

Design flow of this facility is 0.075 MGD.

Effective Dates: During the period beginning with the effective date of this permit and the CTO for the 0.075 MGD flow tier, and lasting until the issuance of the CTO for the 0.15, 0.25, or 0.45 MGD facilities or until the expiration date of the permit, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS		
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type		
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE		
cBOD ₅ (June through November)	3, 5	5 mg/L	1.4 kg/day	8 mg/L	2.3 kg/day	NA	NA	1/W	4H-C
BOD ₅ (December through May)	3, 5	30 mg/L	8.5 kg/day	45 mg/L	13 kg/day	NA	NA	1/W	4H-C
TSS (June through November)	2	5.0 mg/L	1.4 kg/day	7.5 mg/L	2.3 kg/day	NA	NA	1/W	4H-C
TSS (December through May)	2	30 mg/L	8.5 kg/day	45 mg/L	13 kg/day	NA	NA	1/W	4H-C
TKN (June through November)	3, 5	3.0 mg/L	0.85 kg/day	4.5 mg/L	1.3 kg/day	NA	NA	1/W	4H-C
TKN (December through May)	3, 5	10 mg/L	2.8 kg/day	15 mg/L	4.2 kg/day	NA	NA	1/W	4 H-C
Nitrate+Nitrite, as N	3	NL mg/L	NA	NA	NA	NA	2/M	4H-C	
Total Nitrogen **	3	NL mg/L	NA	NA	NA	NA	2/M	Calculated	
Total Nitrogen Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	Calculated	
Total Nitrogen Calendar Year	3	NL mg/L	NA	NA	NA	NA	1/YR	Calculated	
Total Phosphorus	3	NL mg/L	NA	NA	NA	NA	2/M	4H-C	
Total Phosphorus Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	Calculated	
Total Phosphorus Calendar Year	3	NL mg/L	NA	NA	NA	NA	1/YR	Calculated	
pH (s.u.)	3	NA		NA	6.0 s.u.	9.0 s.u.	1/D	Grab	
Dissolved Oxygen	3, 5	NA		NA	6.0 mg/L	NA	1/D	Grab	
Total Residual Chlorine	3	0.019 mg/L		0.023 mg/L	NA	NA	3/D at 4 hour intervals	Grab	
<i>E. coli</i> (Geometric Mean)*	3	126 n/100mls		NA	NA	NA	1/W	Grab	
Chronic Toxicity – <i>C. dubia</i> (TU _c)\$	N/A	NA		NA	NA	NL	1/3M	4H-C	
Chronic Toxicity – <i>P. promelas</i> (TU _c)\$	N/A	NA		NA	NA	NL	1/3M	4H-C	

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. VDH-DEQ Disinfection Policy
5. Regional DO Model
6. 9 VAC 25-40-10

4H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 4-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of four (4) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of four (4) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by $\geq 10\%$ or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

* If chlorine is not used for disinfection, the monitoring shall be Twice per week (2/W) between 10 am and 4 pm.

** Total Nitrogen = Sum of TKN plus Nitrate + Nitrite

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.

3/D = Three per day at 4 hr intervals.

1/W = Once per week.

2/M = Twice per month >7 days apart.

1/M = Once per month.

1/3M = Once every three months.

1/YR = Once every year.

\$ The permittee shall monitor the effluent quarterly for the chronic toxicity tests for *C. dubia* and *P. promelas* during the first two years the new facility is in operation. After completion of eight quarterly samples, the permittee may submit a written request to DEQ-NRO for a reduction or suspension in the sampling frequency.

19.b Effluent Limitations/Monitoring Requirements:

Design flow of this facility is 0.15 MGD.

Effective Dates: During the period beginning with the issuance of the CTO for the 0.15-MGD facility and lasting until the issuance of the CTO for the 0.25 or 0.45 MGD facility or until the expiration date of the permit, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS		
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type		
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE		
cBOD ₅ (June through November)	3, 5	5 mg/L	2.8 kg/day	8 mg/L	4.5 kg/day	NA	NA	3D/W	8H-C
BOD ₅ (December through May)	3, 5	30 mg/L	17 kg/day	45 mg/L	26 kg/day	NA	NA	3D/W	8H-C
TSS (June through November)	2	5.0 mg/L	2.8 kg/day	7.5 mg/L	4.3 kg/day	NA	NA	3D/W	8H-C
TSS (December through May)	2	30 mg/L	17 kg/day	45 mg/L	26 kg/day	NA	NA	3D/W	8H-C
TKN (June through November)	3, 5	3.0 mg/L	1.7 kg/day	4.5 mg/L	2.6 kg/day	NA	NA	3D/W	8H-C
TKN (December through May)	3, 5	10 mg/L	5.7 kg/day	15 mg/L	8.5 kg/day	NA	NA	3D/W	8H-C
Nitrate+Nitrite, as N	3	NL mg/L	NA	NA	NA	NA	2/M	8H-C	
Total Nitrogen **	3	NL mg/L	NA	NA	NA	NA	2/M	Calculated	
Total Nitrogen Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	Calculated	
Total Nitrogen Calendar Year	3, 6	8.0 mg/L	NA	NA	NA	NA	1/YR	Calculated	
Total Phosphorus	3	NL mg/L	NA	NA	NA	NA	2/M	8H-C	
Total Phosphorus Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	Calculated	
Total Phosphorus Calendar Year	3, 6	1.0 mg/L	NA	NA	NA	NA	1/YR	Calculated	
pH (s.u.)	3	NA	NA	6.0 s.u.	9.0 s.u.	1/D	Grab		
Dissolved Oxygen	3, 5	NA	NA	6.8 mg/L	NA	1/D	Grab		
Total Residual Chlorine	3	0.010 mg/L	0.013 mg/L	NA	NA	3/D at 4 hour intervals	Grab		
<i>E. coli</i> (Geometric Mean)*	3	126 n/100mls	NA	NA	NA	1/W	Grab		
Chronic Toxicity – <i>C. dubia</i> (TU _c)\$		NA	NA	NA	NL	1/3M	8H-C		
Chronic Toxicity – <i>P. promelas</i> (TU _c)\$		NA	NA	NA	NL	1/3M	8H-C		

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. VDH-DEQ Disinfection Policy
5. Regional DO Model
6. 9 VAC 25-40-10

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

TIRE = Totalizing, indicating and recording equipment.

I/D = Once every day.

3/D = Three per day at 4 hr intervals.

I/W = Once per week.

3D/W = Three days per week.

2/M = Twice per month > 7 days apart.

I/M = Once per month.

1/3M = Once every three months.

I/YR = Once every year.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of eight (8) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

* If chlorine is not used for disinfection, the monitoring shall be Three days per week (3D/W) between 10 am and 4 pm.

** Total Nitrogen = Sum of TKN plus Nitrate + Nitrite

\$ The permittee shall monitor the effluent quarterly for the chronic toxicity tests for *C. dubia* and *P. promelas* during the first two years the new facility is in operation. After completion of eight quarterly samples, the permittee may submit a written request to DEQ-NRO for a reduction or suspension in the sampling frequency.

19.c Effluent Limitations/Monitoring Requirements:

Design flow of this facility is 0.250 MGD.

Effective Dates: During the period beginning with the issuance of the CTO for the 0.250-MGD facility and lasting until the issuance of the CTO for the 0.450-MGD facility or until the expiration date of the permit, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS		
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type		
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE		
cBOD ₅ (June through November)	3, 5	5 mg/L	4.7 kg/day	8 mg/L	7.6 kg/day	NA	NA	3D/W	8H-C
BOD ₅ (December through May)	3, 5	30 mg/L	28 kg/day	45 mg/L	43 kg/day	NA	NA	3D/W	8H-C
TSS (June through November)	2	5.0 mg/L	4.7 kg/day	7.5 mg/L	7.1kg/day	NA	NA	3D/W	8H-C
TSS (December through May)	2	30 mg/L	28 kg/day	45 mg/L	43 kg/day	NA	NA	3D/W	8H-C
TKN (June through November)	3, 5	3.0 mg/L	2.8 kg/day	4.5 mg/L	4.2 kg/day	NA	NA	3D/W	8H-C
TKN (December through May)	3, 5	10 mg/L	9.5 kg/day	15 mg/L	14 kg/day	NA	NA	3D/W	8H-C
Nitrate+Nitrite, as N	3	NL mg/L	NA	NA	NA	NA	2/M	8H-C	
Total Nitrogen**	3	NL mg/L	NA	NA	NA	NA	2/M	Calculated	
Total Nitrogen Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	Calculated	
Total Nitrogen Calendar Year	3, 6	8.0 mg/L	NA	NA	NA	NA	1/YR	Calculated	
Total Phosphorus	3	NL mg/L	NA	NA	NA	NA	2/M	8H-C	
Total Phosphorus Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	Calculated	
Total Phosphorus Calendar Year	3, 6	1.0 mg/L	N/A	NA	NA	NA	1/YR	Calculated	
pH (s.u.)	3	NA		NA	6.0 s.u.	9.0 s.u.	1/D	Grab	
Dissolved Oxygen	3, 5	NA		NA	6.8 mg/L	NA	1/D	Grab	
Total Residual Chlorine	3	0.007 mg/L	0.009 mg/L		NA	NA	3/D at 4 hour intervals	Grab	
<i>E. coli</i> (Geometric Mean)*	3	126 n/100mls	NA		NA	NA	1/W	Grab	
Chronic Toxicity – <i>C. dubia</i> (TU _c)\$	NA	NA		NA	NA	NL	1/3M	8H-C	
Chronic Toxicity – <i>P. promelas</i> (TU _c)\$	NA	NA		NA	NA	NL	1/3M	8H-C	

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. VDH-DEQ Disinfection Policy
5. Regional DO Model
6. 9 VAC 25-40-10

MGD = Million gallons per day.

NA = Not applicable.

1/D = Once every day.

3/D = Three per day at 4 hr intervals.

1/W = Once per week.

3D/W = Three days per week.

2/M = Twice per month >7 days apart.

1/M = Once per month.

1/3M = Once every three months.

1/YR = Once every year.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of eight (8) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by ≥10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

* If chlorine is not used for disinfection, the monitoring shall be Three days per week (3D/W) between 10 am and 4 pm.

** Total Nitrogen = Sum of TKN plus Nitrate + Nitrite

\$ The permittee shall monitor the effluent quarterly for the chronic toxicity tests for *C. dubia* and *P. promelas* during the first two years the new facility is in operation. After completion of eight quarterly samples, the permittee may submit a written request to DEQ-NRO for a reduction or suspension in the sampling frequency.

19.d Effluent Limitations/Monitoring Requirements:

Design flow of this facility is 0.450 MGD.

Effective Dates: During the period beginning with the issuance of the CTO for the 0.450-MGD facility and lasting until the expiration date of the permit.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS					MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type	
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE	
cBOD ₅ (June through November)	3, 5	3 mg/L	5.1 kg/day	4 mg/L	6.8 kg/day	NA	3D/W	
BOD ₅ (December through May)	3, 5	30 mg/L	51 kg/day	45 mg/L	77 kg/day	NA	3D/W	
TSS (June through November)	2	5.0 mg/L	8.5 kg/day	7.5 mg/L	13 kg/day	NA	3D/W	
TSS (December through May)	2	30 mg/L	51 kg/day	45 mg/L	77 kg/day	NA	3D/W	
TKN (June through November)	3, 5	3.0 mg/L	5.1 kg/day	4.5 mg/L	7.7 kg/day	NA	3D/W	
TKN (December through May)	3, 5	10 mg/L	17 kg/day	15 mg/L	26 kg/day	NA	3D/W	
Nitrate+Nitrite, as N	3	NL mg/L	NA	NA	NA	NA	2/M	
Total Nitrogen**	3	NL mg/L	NA	NA	NA	NA	2/M	
Total Nitrogen Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	
Total Nitrogen Calendar Year	3, 6	8.0 mg/L	NA	NA	NA	NA	1/YR	
Total Phosphorus	3	NL mg/L	NA	NA	NA	NA	2/M	
Total Phosphorus Year to Date	3	NL mg/L	NA	NA	NA	NA	1/M	
Total Phosphorus Calendar Year	3, 6	1.0 mg/L	NA	NA	NA	NA	1/YR	
pH (s.u.)	3	NA		NA	6.0 s.u.	9.0 s.u.	1/D	
Dissolved Oxygen	3, 5	NA		NA	7.2 mg/L	NA	1/D	
Total Residual Chlorine	3	0.005 mg/L		0.006 mg/L	NA	NA	3/D at 4 hour intervals	
<i>E. coli</i> (Geometric Mean)*	3	126 n/100mls		NA	NA	NA	1/W	
Chronic Toxicity – <i>C. dubia</i> (TU _c)\$	NA	NA		NA	NA	NL	1/3M	
Chronic Toxicity – <i>P. promelas</i> (TU _c)\$	NA	NA		NA	NA	NL	1/3M	

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. VDH-DEQ Disinfection Policy
5. Regional DO Model
6. 9 VAC 25-40-10

MGD = Million gallons per day.

NA = Not applicable.

I/D = Once every day.

3/D = Three per day at 4 hr intervals.

I/W = Once per week.

3D/W = Three days per week.

2/M = Twice per month >7 days apart.

I/M = Once per month.

1/3M = Once every three months.

1/YR = Once every year.

8H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 8-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of eight (8) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum of eight (8) grab samples obtained at hourly or smaller intervals may be collected. Where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by $\geq 10\%$ or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

* If chlorine is not used for disinfection, the monitoring shall be Three days per week (3D/W) between 10 am and 4 pm.

** Total Nitrogen = Sum of TKN plus Nitrate + Nitrite

\$ The permittee shall monitor the effluent quarterly for the chronic toxicity tests for *C. dubia* and *P. promelas* during the first two years the new facility is in operation. After completion of eight quarterly samples, the permittee may submit a written request to DEQ-NRO for a reduction or suspension in the sampling frequency.

20. Other Permit Requirements :

- a) Part I.B. of the permit contains additional chlorine monitoring requirements, quantification levels and compliance reporting instructions.

These additional chlorine requirements are necessary per the Sewage Collection and Treatment Regulations at 9VAC25-70 and by the Water Quality Standards at 9VAC25-260-170. A minimum chlorine residual must be maintained at the exit of the chlorine contact tank to assure adequate disinfection. No more than 10% of the monthly test results for TRC at the exit of the chlorine contact tank shall be <1.0 mg/L with any TRC <0.6 mg/L considered a system failure. Monitoring at numerous STPs has concluded that a TRC residual of 1.0 mg/L is an adequate indicator of compliance with the *E. coli* criteria. *E. coli* limits are defined in this section as well as monitoring requirements to take effect should an alternate means of disinfection be used.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

- b) Permit Section Part I.C., details the requirements for Toxics Management Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A TMP is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board based on effluent variability, compliance history, IWC, and receiving stream characteristics.

The existing Boston Water & Sewer STP (VA0065358) required the permittee to perform toxics monitoring. The acute and chronic tests failed, so DEQ notified the permittee on August 6, 1999 that a Toxics Reduction Evaluation (TRE) was necessary. A TRE plan was submitted in December 1999. The plan was to optimize the plant performance and plant modifications were made to reduce ammonia concentrations in the effluent. In June 2000, additional toxicity tests were done. The acute tests passed, but the chronic tests failed – NOEC = 50% for *C. dubia*. DEQ notified the permittee in August 2000 that a Toxics Identification Evaluation (TIE) plan was needed. Since then, no specific toxicant has been identified and the chronic tests continue to fail the criteria. In January 2003, DEQ notified the permittee that a Whole Effluent Toxicity (WET) limit would be required with the permit reissuance. The WET limit was determined using the 12/5/01 revision of the WETLIM10.xls file. The WET limit established was 1.44 TU_c, which is equal to a NOEC of 69%. Monitoring is quarterly for the chronic toxicity tests for *C. dubia* and *P. promelas*.

Since this will be a new facility that will treat the wastewater currently treated by the existing facility, the permittee shall monitor the effluent quarterly for the chronic toxicity tests for *C. dubia* and *P. promelas* for the first two years for a total of eight quarters that the facility is in operation. If all tests pass the decision criteria, no further toxicity monitoring shall be required.

21. Other Special Conditions:

- a) **95% Capacity Reopener.** The VPDES Permit Regulation at 9VAC25-31-200.B.4. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. The facility is a PVOTW.
- b) **Indirect Dischargers.** Required by VPDES Permit Regulation, 9VAC25-31-200 B.1. and B.2. for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.
- c) **O&M Manual Requirement.** Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. Within 90 days of the CTO for any of the flow tiers, the permittee shall submit for approval an Operations and Maintenance (O&M) Manual to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO). Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.
- d) **CTC, CTO Requirement.** The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.
- e) **Licensed Operator Requirement.** The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class II operator.
- f) **Reliability Class.** The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.
- g) **Water Quality Criteria Reopener.** The VPDES Permit Regulation at 9VAC25-31-220 D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should data collected and submitted for Attachment A of the permit, indicate the need for limits to ensure protection of water quality criteria, the permit may be modified or alternately revoked and reissued to impose such water quality-based limitations.
- h) **Water Quality Criteria Monitoring.** State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.
- i) **Sludge Reopener.** The VPDES Permit Regulation at 9VAC25-31-220.C. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.
- j) **Sludge Use and Disposal.** The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2., and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.

- k) Instream Monitoring. The State Water Control Law 62.1-44.21 authorizes the Board to request information needed to determine the impact of a discharge on State waters. Therefore, the permittee will be required to conduct an In-stream monitoring program commencing with the issuance of a CTO for the facility. The monitoring should be conducted at a point downstream of the outfall, which allows for the complete mixing of the receiving stream and the effluent. The permittee must monitor the receiving stream monthly for pH, Dissolved Oxygen, Temperature and Total Hardness. Results of the monitoring shall be reported with the DMR for the month in which the analysis is conducted.
- l) Nutrient Reopener. 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
- m) Nutrient Offsets. The Virginia General Assembly, in their 2005 session, enacted a new Article 4.02 (Chesapeake Bay Watershed Nutrient Credit Exchange Program) to the Code of Virginia to address nutrient loads to the Bay. Section 62.1-44.19:15 sets forth the requirements for new and expanded dischargers, which are captured by the requirements of the law, including the requirement that non-point load reductions acquired for the purpose of offsetting nutrient discharges be enforced through the individual VPDES permit.
- n) E3/E4. 9VAC25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
- o) Treatment Works Closure Plan. A special condition has been established as part of this permit reissuance, requiring the permittee to submit a plan and schedule for closure of the existing Boston Water & Sewer STP (VA0065358). The plan must be submitted within 30 days of the issuance of a Certificate To Construct (CTC) for the proposed Boston Water & Sewer STP (VA0088749). This condition has been incorporated into this permit to insure water quality criteria is protected, since the regional stream model used to develop limits for the proposed plant, did not take into account the discharge from the existing treatment plant. This condition duplicates the requirements of the special condition found in the VPDES Permit No. VA0065358.

Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

- a) Special Conditions:
- 1) The Nutrient Reporting Calculation Special Condition was replaced by the Nutrient Reporting Calculations in Part I.B. of the permit.
 - 2) The Nutrient Offsets Special Condition was updated to reflect current agency language.
 - 3) The Nutrient Enriched Waters Reopener was replaced with the Nutrient Reopener.
 - 4) The E3/E4 Special Condition was added to the permit.
- b) Monitoring and Effluent Limitations:
- 1) The Annual Nutrient Loads were removed from this individual VPDES permit since the facility also has coverage under the Nutrient General Permit which limits the annual Total Nitrogen and Total Phosphorus loadings. The Nutrient GP permit number is VAN020111.
 - 2) Orthophosphate monitoring was removed since this parameter is monitored through VAN020111.
 - 3) The monitoring frequency for Total Nitrogen, Nitrate+Nitrite, and Total Phosphorus were set to match the frequencies set forth in 9VAC25-820.
 - 4) The monitoring frequencies for the Total Residual Chlorine for all flow tiers was increased from 1/D to 3/D at 4 hour intervals in accordance with current agency guidance.

24. Variances/Alternate Limits or Conditions:

None

25. Public Notice Information:

First Public Notice Date: 10/21/2010

Second Public Notice Date: 10/28/2010

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3834, Alison.Thompson@deq.virginia.gov. See Attachment 13 for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):

The Hazel River at Segment VAN-E04_HAZ01C06 is listed as impaired for not meeting the recreational water quality use standard. Sufficient excursions from the maximum *E. coli* bacteria criterion (5 of 11 samples - 45.4%) were recorded at DEQ's ambient water quality monitoring station (3-HAZ026.16) at the Route 522 crossing to assess this stream segment as not supporting of the recreation use goal for the 2008 water quality assessment.

This segment of the Hazel River was included in the Bacteria TMDL for the Upper Rappahannock River Basin, approved by EPA on 01/23/2008.

Currently, there are two permitted treatment facilities associated with Boston Sewer and Water (VA0065358 and VA0088749). VA0065358 is currently in operation, and has a design flow of 0.0150 MGD. VA0088749, has not been built yet, but has a design flow of 0.4500 MGD. Once the second facility has been built, and begins operation, the first facility will go offline. Thus, during TMDL development, staff decided that it was not practical to assign a load for both facilities, since both facilities will not be operating at the same time. Rather, a load was assigned to the facilities based off the maximum design flow of the new facility, VA0088749, because that facility has the larger design flow. A load for the new facility will be sufficient to cover the current facility while it is in operation, and provide for the operation of the new facility, once it is built. Thus, the WLA assigned to the new facility (VA0088749) is based off its maximum permitted design flow of 0.450 MGD, and is **7.83E+11 cfu/year for *E. coli* bacteria**.

TMDL Reopener: This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

27. Additional Comments:

Previous Board Action: None.

Staff Comments: None.

Public Comment: No comments were received during the public notice.

EPA Checklist: The checklist can be found in Attachment 14.

Attachments to the Fact Sheet for Boston Water & Sewer STP – VA0088749

- Attachment 1 - Flow Frequency Determination
- Attachment 2 - Treatment Schematic
- Attachment 3 - Topographic Map
- Attachment 4 - Photos of the Hazel River near the proposed outfall location
- Attachment 5 - Planning Statement
- Attachment 6 - Water Quality Criteria and WLA Calculations for 0.075 flow tier
pH and Temperature data from the Hazel River
- Attachment 7 - Water Quality Criteria and WLA Calculations for 0.15 flow tier
- Attachment 8 - Water Quality Criteria and WLA Calculations for 0.25 flow tier
- Attachment 9 - Water Quality Criteria and WLA Calculations for 0.45 flow tier
- Attachment 10 - Limit Evaluations for Ammonia as Nitrogen
- Attachment 11 - Limit evaluations for Total Residual Chlorine
- Attachment 12 - Dissolved Oxygen Modeling 2005
- Attachment 13 - Public Notice
- Attachment 14 - EPA Checklist

Flow Frequency Determination
Alison L. Thompson – NRO Water Permit Writer
August 10, 2010

Boston Water & Sewer STP – New Facility
VA0088749

This flow frequency determination was done as part of the 2010 reissuance of the Boston Water & Sewer STP – New Facility VPDES permit. The flow determination was last done with the 2005 reissuance. There are updated stream flow statistics from 2006 available, so the flows were updated. Drainage area proportions were used to determine the flows at the discharge point. The same approach was used for this determination using the 2005 updated flow data from the gaging station on Hazel River at Rixeyville, VA (#01663500) as the reference station. The values presented at the discharge point do not address any withdrawals, discharges, or springs lying upstream.

Hazel River at Rixeyville, VA (#01663500):

Drainage Area = 287 sq. mi.	
1Q10 = 4.0 cfs	High Flow 7Q10 = 75 cfs
7Q10 = 5.9 cfs	High Flow 1Q10 = 64 cfs
30Q5 = 20 cfs	High Flow 30Q10 = 104 cfs
30Q10 = 12 cfs	Harmonic Mean = 87 cfs

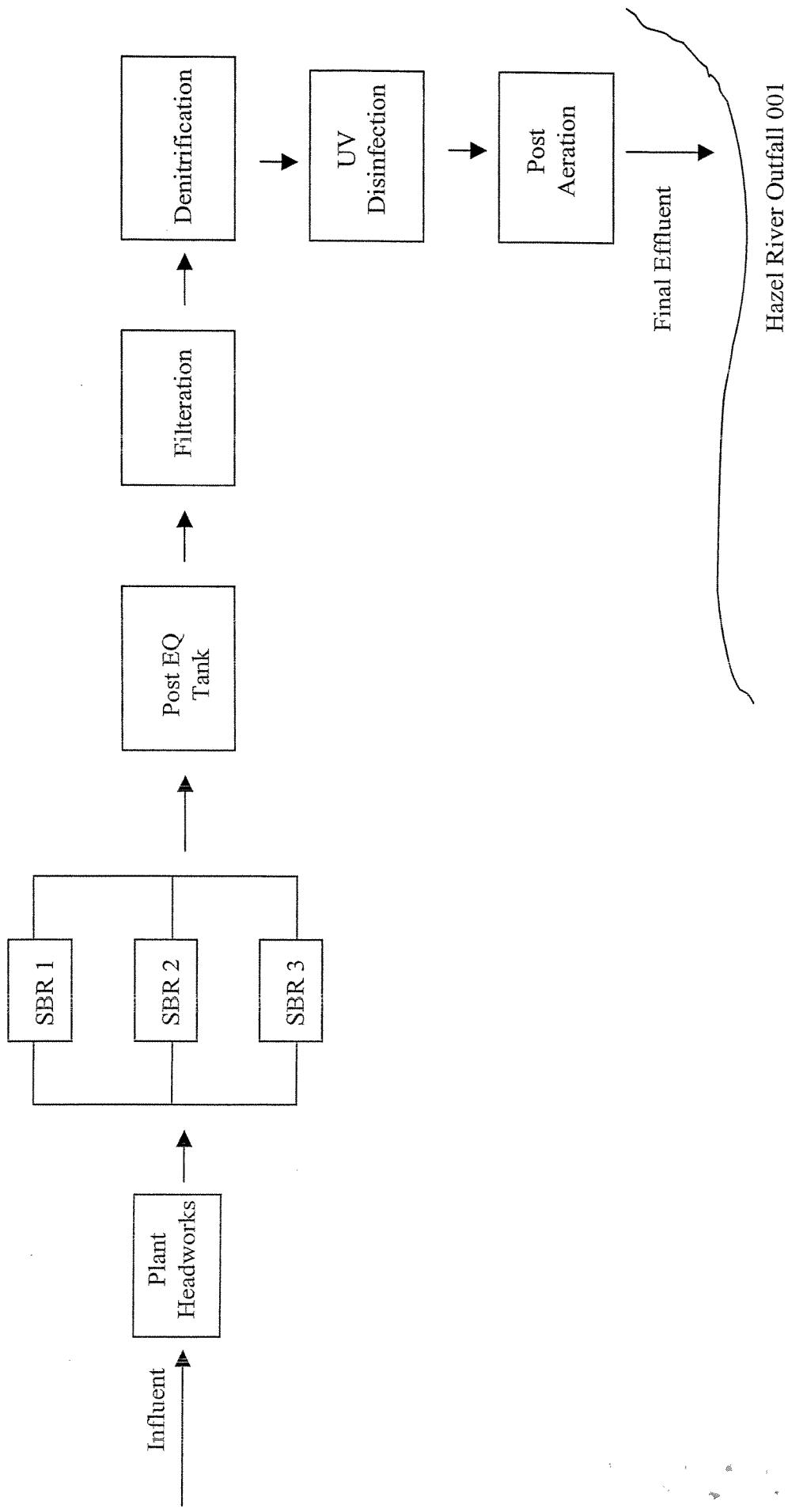
Hazel River at discharge point:

Drainage Area = 59.1 sq. mi.	
1Q10 = 0.82 cfs	1Q10 = 0.53 mgd
7Q10 = 1.2 cfs	7Q10 = 0.78 mgd
30Q5 = 4.1 cfs	30Q5 = 2.7 mgd
30Q10 = 2.5 cfs	30Q10 = 1.6 mgd
High Flow 7Q10 = 15.4 cfs	High Flow 7Q10 = 10 mgd
High Flow 1Q10 = 13.1 cfs	High Flow 1Q10 = 8.5 mgd
High Flow 30Q10 = 21.4 cfs	High Flow 30Q10 = 13.8 mgd
Harmonic Mean = 18 cfs	Harmonic Mean = 12 mgd

High flow months are December through May.

Attachment 2

**.450 Advanced Activated Sludge Treatment with Total Nitrogen Removal
Boston Water & Sewer STP VPDES VA0088749**



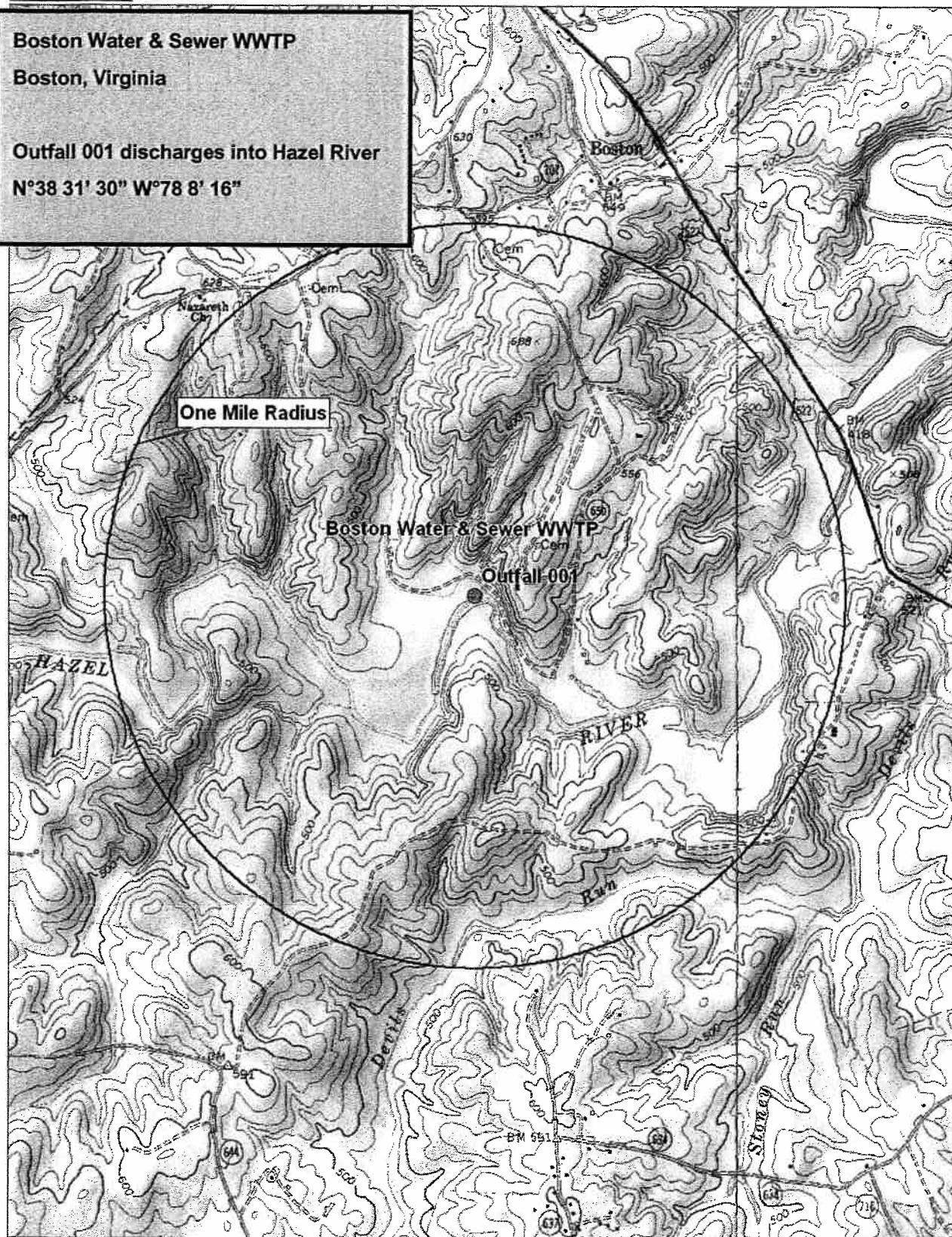


Boston Water & Sewer WWTP

Boston, Virginia

Outfall 001 discharges into Hazel River

N°38 31' 30" W°78 8' 16"



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Boston Water & Sewer STP
VA0088749

Photos taken July 10, 2003
Page 1 c



Hazel River upstream of the flow from the UT where VA0065358 discharges.



Hazel River downstream of the flow from the UT where VA0065358 discharges.

To: Alison Thompson
From: Katie Conaway

Date: May 19, 2010
Subject: Planning Statement for Boston Water & Sewer STP – New Facility
Permit Number: VA0088749

Discharge Type: Municipal

Discharge Flow: Proposed flow tiers of 0.075, 0.15, 0.25 and 0.45 MGD

Receiving Stream: Hazel River, UT

Latitude / Longitude: 38.31.30 78.08.16 (proposed)

Waterbody ID: E04R, RA10

Water Quality Standards: Class III, Section 4

1. Is there monitoring data for the receiving stream?

No.

- If yes, please attach latest summary.
- If no, where is the nearest downstream monitoring station.

The nearest downstream DEQ monitoring station with ambient water quality data is Station 3-HAZ026.16, located on the Hazel River at the Route 522 bridge crossing. Station 3-HAZ026.16 lies within Assessment Unit VAN-E04_HAZ01C06, which extends from the confluence with the Hughes River, and continues downstream until the confluence with Devils Run. Station 3-HAZ026.16 is located approximately 2.1 rivermiles downstream from the proposed outfall of VA0088749. Below is a monitoring summary for segment VAN-E04_HAZ01C06 as taken from the 2008 Integrated Assessment:

Class III, Section 4.

DEQ ambient monitoring station 3-HAZ026.16, at Route 522.

E .coli monitoring find a bacterial impairment, resulting in an impaired classification for the recreation use. The aquatic life use is considered fully supporting. Wildlife and fish consumption were not assessed.

2. Is the receiving stream on the current 303(d) list?

No, the Unnamed Tributary to the Hazel River is not on the 303(d) list.

- If yes, what is the impairment?

N/A

- Has the TMDL been prepared?

N/A

- If yes, what is the WLA for the discharge?

N/A

- If no, what is the schedule for the TMDL?

N/A

3. If the answer to (2) above is no, is there a downstream 303(d) listed impairment?

Yes.

- If yes, what is the impairment?

The Hazel River at Segment VAN-E04_HAZ01C06 is listed as impaired for not meeting the recreational water quality use standard. Sufficient excursions from the maximum *E. coli* bacteria criterion (5 of 11 samples - 45.4%) were recorded at DEQ's ambient water quality monitoring station (3-HAZ026.16) at the Route 522 crossing to assess this stream segment as not supporting of the recreation use goal for the 2008 water quality assessment.

- Has a TMDL been prepared?

Yes. This segment of the Hazel River was included in the Bacteria TMDL for the Upper Rappahannock River Basin, approved by EPA on 01/23/2008.

- Will the TMDL include the receiving stream?

While the TMDL did not specifically include the receiving stream, it did include all upstream point source dischargers.

- Is there a WLA for the discharge?

Yes. Currently, there are two permitted treatment facilities associated with Boston Sewer and Water (VA0065358 and VA0088749). VA0065358 is currently in operation, and has a design flow of 0.0150 MGD. VA0088749, has not been built yet, but has a design flow of 0.4500 MGD. Once the second facility has been built, and begins operation, the first facility will go offline. Thus, during TMDL development, staff decided that it was not practical to assign a load for both facilities, since both facilities will not be operating at the same time. Rather, a load was assigned to the facilities based off the maximum design flow of the new facility, VA0088749, because that facility has the larger design flow. A load for the new facility will be sufficient to cover the current facility while it is in operation, and provide for the operation of the new facility, once it is built. Thus, the WLA assigned to the new

facility (VA0088749) is based off its maximum permitted design flow of 0.450 MGD, and is **7.83E+11 cfu/year for *E. coli* bacteria.**

- What is the schedule for the TMDL?

TMDL was approved by EPA on 01/23/2008.

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

Not at this time.

Attachment 6

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Boston Water & Sewer STP - 0.075 MGDN

Facility Permit No.: VA0088749

Receiving Stream: Hazel River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

	Stream Flows	Mixing Information	Effluent Information
Mean Hardness (as CaCO ₃) =	25 mg/L	Annual - 1Q10 Mix =	Mean Hardness (as CaCO ₃) = 25 mg/L
90% Temperature (Annual) =	23.4 deg C	-7Q10 Mix =	90% Temp (Annual) = 23.4 deg C
90% Temperature (Wet season) =	15.7 deg C	-30Q10 Mix =	90% Temp (Wet season) = 15.7 deg C
90% Maximum pH =	7.9 SU	Wet Season - 1Q10 Mix =	90% Maximum pH = 7.9 SU
10% Maximum pH =	SU	-30Q10 Mix =	10% Maximum pH = SU
Tier Designation (1 or 2) =	2	Discharge Flow =	0.075 MGD
Public Water Supply (PWS) /N? =	n		
Trout Present Y/N? =	n		
Early Life Stages Present Y/N? =	y		

Water Quality Criteria

	Background Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.3E+02	--	--	na	3.7E+04	--	--	na	3.7E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	3.4E+02	--	--	na	3.4E+01
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	4.0E+02	--	--	na	4.0E+01
Adrin ^c	0	3.0E+00	--	na	5.0E-04	8.9E+00	--	na	8.1E-02	7.5E-01	--	na	8.1E-03
Ammonia-N (mg/l) (Yearly)	0	1.01E+01	1.58E+00	na	--	3.0E+01	3.5E+01	na	--	2.53E+00	3.95E-01	na	--
Ammonia-N (mg/l) (High flow)	0	1.01E+01	2.59E+00	na	--	1.2E+03	4.8E+02	na	--	2.53E+00	6.48E-01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.5E+06	--	--	na	4.0E+03
Antimony	0	--	--	na	6.4E+02	--	--	na	2.4E+04	--	--	na	2.4E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	1.0E+03	1.7E+03	na	--	8.5E+01	3.8E+01	na	--
Barium	0	--	--	na	--	--	--	na	--	--	na	--	
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	8.2E+04	--	--	na	8.2E+03
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	3.2E-01	--	--	na	3.2E-02
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	2.9E+01	--	--	na	2.9E+00
Benzo (b) fluoranthene ^c	0	--	--	na	6.5E+04	--	--	na	2.4E+06	--	--	na	2.4E+05
Benzo (k) fluoranthene ^c	0	--	--	na	2.2E+01	--	--	na	1.8E+01	--	--	na	2.9E+00
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	2.9E+01	--	--	na	2.9E+00
Bis2-Chloroethyl Ether ^c	0	--	--	na	5.3E+00	--	--	na	8.3E+02	--	--	na	8.5E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.6E+04	--	--	na	2.4E+06	--	--	na	2.4E+05
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	3.5E+03	--	--	na	3.5E+02
Bronform ^c	0	--	--	na	1.4E+03	--	--	na	2.3E+05	--	--	na	2.3E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	7.0E+04	--	--	na	7.0E+03
Cadmium	0	8.2E-01	3.8E-01	na	--	2.4E+00	4.4E+00	na	--	2.1E-01	9.5E-02	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.8E+01	--	--	na	2.6E+03	--	--	na	2.6E+02
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	7.1E+00	4.9E-02	na	1.3E+00	6.0E-01	1.1E-03	na	1.3E-01
Chloride	0	8.6E+05	2.3E-05	na	--	2.5E+06	2.6E+06	na	--	2.2E+05	5.8E+04	na	--
TRC	0	1.9E+01	1.1E+01	na	--	5.6E+01	1.3E+02	na	--	4.8E+00	2.8E+00	na	--
Chlorobenzene ^c Page 1 of 4	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	na	5.9E+03

	Wasteload Allocations	Antidegradation Baseline	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Mean Hardness (as CaCO ₃) =	25 mg/L	9.9E+01	--	--	na	3.7E+03	--	--	na	3.7E+03	--	--	na	3.7E+03
90% Temp (Annual) =	23.4 deg C	9.3E+01	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	na	3.4E+01
90% Temperature (Wet season) =	15.7 deg C	2.5E+00	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	na	4.0E+01
90% Maximum pH =	7.9 SU	5.0E+04	--	--	na	6.1E+00	--	--	na	6.1E+00	--	--	na	6.1E+03
10% Maximum pH =	SU	30Q10 (Wet season)	13.8 MGD	13.8 MGD	Wet Season - 1Q10 Mix =	100 %	100 %	100 %	na	100 %	100 %	100 %	na	100 %
Tier Designation (1 or 2) =	2	3Q05 =	2.7 MGD	2.7 MGD	-30Q10 Mix =	100 %	100 %	100 %	na	100 %	100 %	100 %	na	100 %
Public Water Supply (PWS) /N? =	n	Harmonic Mean =	12 MGD	12 MGD										
Trout Present Y/N? =	n													
Early Life Stages Present Y/N? =	y													
	Most Limiting Allocations													

Parameter	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations						
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH			
Chlorodibromomethane ^c	0	--	--	--	na	1.3E+02	--	--	na	2.1E+04	--	--	na	1.3E+01	--	--	na	2.1E+03	--	--	na	2.1E+03		
Chloroform	0	--	--	--	na	1.1E+04	--	--	na	4.1E+05	--	--	na	1.1E+03	--	--	na	4.1E+04	--	--	na	4.1E+04		
2-Chloronaphthalene	0	--	--	--	na	1.6E+03	--	--	na	5.9E+04	--	--	na	1.6E+02	--	--	na	5.9E+03	--	--	na	5.9E+03		
2-Chlorophenol	0	--	--	--	na	1.5E+02	--	--	na	5.6E+03	--	--	na	1.5E+01	--	--	na	5.6E+02	--	--	na	5.6E+02		
Chloropyrifos	0	8.3E-02	4.1E-02	na	--	2.5E-01	4.7E-01	na	--	2.1E-02	1.0E-02	na	--	1.7E-01	1.2E-01	na	--	1.7E-01	1.2E-01	na	--	na		
Chromium III	0	1.8E-02	2.4E-01	na	--	5.4E+02	2.7E+02	na	--	4.6E+01	6.0E+00	na	--	3.7E+02	6.8E+01	na	--	3.7E+02	6.8E+01	na	--	na		
Chromium VI	0	1.6E-01	1.1E-01	na	--	4.7E+01	1.3E+02	na	--	4.0E+00	2.8E+00	na	--	3.2E+01	3.1E+01	na	--	3.2E+01	3.1E+01	na	--	na		
Chromium, Total	0	--	--	1.0E+02	na	--	--	na	--	--	1.0E+01	na	--	--	--	3.7E+02	na	--	--	3.7E+02	na	--	na	
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	2.9E+00	--	--	na	1.8E-03	--	--	na	2.9E-01	--	--	na	2.9E-01	--	na	
Copper	0	--	--	3.6E+00	2.7E+00	na	--	1.1E+01	3.1E+01	na	--	9.1E-01	6.8E-01	na	--	7.3E+00	7.8E+00	na	--	7.3E+00	7.8E+00	na	--	
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	6.5E+01	5.9E+01	na	5.9E+05	5.5E+00	1.3E+00	na	1.6E+03	4.4E+01	1.5E+01	na	5.9E+04	4.4E+01	1.5E+01	na	5.9E+04	4.4E+01	1.5E+01	
DDD ^c	0	--	--	na	3.1E-03	--	--	na	5.0E-01	--	--	na	3.1E-04	--	--	na	5.0E-02	--	--	na	5.0E-02	--	na	
DDE ^c	0	--	--	na	2.2E-03	--	--	na	3.5E-01	--	--	na	2.2E-04	--	--	na	3.5E-02	--	--	na	3.5E-02	--	na	
DDT ^c	0	1.1E+00	1.0E+03	na	--	2.2E-03	3.3E+00	1.1E-02	na	3.5E-01	2.5E-04	na	--	2.2E-04	2.9E-03	na	3.5E-02	2.2E+00	2.9E-03	na	3.5E-02	2.2E+00	2.9E-03	
Demeton	0	--	1.0E-01	na	--	5.0E-01	1.9E+00	na	--	4.3E-02	4.3E-02	na	--	3.4E-01	4.8E-01	na	--	3.4E-01	4.8E-01	na	--	2.9E-01		
Diazinon	0	1.7E-01	1.7E-01	na	--	1.8E-01	--	na	2.9E+01	--	--	na	1.8E-02	--	--	na	2.9E+00	--	--	na	2.9E+00	--	na	
Dibenzo(a,h)anthracene ^c	0	--	--	na	1.3E+03	--	--	na	1.1E+00	na	--	na	2.5E-02	--	--	na	4.5E+03	--	--	na	4.5E+03	--	na	
1,2-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	3.6E+04	--	--	na	9.6E+01	--	--	na	3.6E+03	--	--	na	3.6E+03	--	na	
1,3-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	7.0E+03	--	--	na	1.9E+01	--	--	na	7.0E+02	--	--	na	7.0E+02	--	na	
1,4-Dichlorobenzene	0	--	--	na	2.8E-01	--	--	na	4.5E+01	--	--	na	2.8E-02	--	--	na	4.5E+00	--	--	na	4.5E+00	--	na	
3,3-Dichlorobenzidine ^c	0	--	--	na	1.7E+02	--	--	na	2.7E+04	--	--	na	1.7E+01	--	--	na	2.7E+03	--	--	na	2.7E+03	--	na	
Dichlorobromomethane ^c	0	--	--	na	3.7E+02	--	--	na	6.0E+04	--	--	na	3.7E+01	--	--	na	6.0E+03	--	--	na	6.0E+03	--	na	
1,2-Dichloroethane ^c	0	--	--	na	7.1E+03	--	--	na	2.6E+05	--	--	na	7.1E+02	--	--	na	2.6E+04	--	--	na	2.6E+04	--	na	
1,1-Dichloroethylene	0	--	--	na	1.0E+04	--	--	na	3.7E+05	--	--	na	1.0E+03	--	--	na	3.7E+04	--	--	na	3.7E+04	--	na	
1,2-Trans-dichloroethylene	0	--	--	na	2.9E+02	--	--	na	1.1E+04	--	--	na	2.9E+01	--	--	na	1.1E+03	--	--	na	1.1E+03	--	na	
2,4-Dichlorophenol	0	--	--	na	1.5E+02	--	--	na	2.4E+04	--	--	na	1.5E+01	--	--	na	2.4E+03	--	--	na	2.4E+03	--	na	
2,4-Dichlorophenoxy acetic acid (2+D)	0	--	--	na	2.1E+02	--	--	na	3.4E+04	--	--	na	2.1E+01	--	--	na	3.4E+03	--	--	na	3.4E+03	--	na	
1,2-Dichloropropane ^c	0	--	--	na	5.4E-02	na	7.1E-01	6.4E-01	na	8.7E-02	6.0E-02	1.4E-02	na	5.4E-05	4.8E-01	1.6E-01	na	8.7E-03	4.8E-01	1.6E-01	na	8.7E-03	4.8E-01	1.6E-01
1,3-Dichloropropene ^c	0	--	--	na	4.4E+04	--	--	na	1.6E+06	--	--	na	4.4E+03	--	--	na	1.6E+05	--	--	na	1.6E+05	--	na	
Dieldrin ^c	0	2.4E-01	5.6E-02	na	8.9E-01	6.4E-01	na	3.1E+04	--	--	na	8.5E-01	--	--	na	3.1E-03	--	--	na	3.1E-03	--	na		
Diethyl Phthalate	0	--	--	na	8.5E-02	--	--	na	4.1E+07	--	--	na	1.1E+05	--	--	na	4.1E+06	--	--	na	4.1E+06	--	na	
2,4-Dimethylphenol	0	--	--	na	1.1E+06	--	--	na	5.5E+03	--	--	na	4.5E+02	--	--	na	1.7E+04	--	--	na	1.7E+04	--	na	
Dimethyl Phthalate	0	--	--	na	5.3E+03	--	--	na	2.0E+05	--	--	na	5.3E+02	--	--	na	2.0E+04	--	--	na	2.0E+04	--	na	
Di-n-Butyl Phthalate	0	--	--	na	2.8E+02	--	--	na	1.0E+04	--	--	na	2.8E+01	--	--	na	1.0E+03	--	--	na	1.0E+03	--	na	
2,4-Dinitrophenoxy	0	--	--	na	3.4E+01	--	--	na	5.5E+03	--	--	na	3.4E+00	--	--	na	5.5E+02	--	--	na	5.5E+02	--	na	
Di-n-Butyl Phthalate	0	--	--	na	6.5E-01	6.4E-01	na	1.9E-06	--	--	na	5.1E-09	--	--	na	1.9E-07	--	--	na	1.9E-07	--	na		
2,4-Dinitrophenol	0	--	--	na	2.0E+00	--	--	na	3.2E+02	--	--	na	2.0E-01	--	--	na	3.2E+01	--	--	na	3.2E+01	--	na	
2-Methyl-4,6-Dinitrophenol	0	2.2E-01	5.6E-02	na	8.9E-01	6.4E-01	na	3.3E+03	5.5E-02	1.4E-02	na	8.9E+00	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01		
2,4-Dinitrotoluene ^c	0	2.2E-01	5.6E-02	na	8.9E-01	6.4E-01	na	3.3E+03	5.5E-02	1.4E-02	na	8.9E+00	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01		
Dioxin 2,3,7,8-	0	--	--	na	6.5E-01	6.4E-01	--	na	3.3E+03	--	--	na	8.9E+00	--	--	na	3.3E+02	--	--	na	3.3E+02	--	na	
Tetrachlorobenzzo-p-dioxin	0	--	--	na	2.2E+00	2.2E+02	9.0E-03	na	6.0E-03	1.7E-01	1.0E-01	na	2.2E+01	--	--	na	2.2E+00	--	--	na	2.2E+00	--	na	
1,2-Diphenylphiazine ^c	0	--	--	na	3.0E-01	--	--	na	1.1E+01	--	--	na	3.0E-02	--	--	na	1.1E+00	--	--	na	1.1E+00	--	na	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E-01	6.4E-01	na	3.3E+03	5.5E-02	1.4E-02	na	8.9E+00	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01		
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E-01	6.4E-01	na	3.3E+03	5.5E-02	1.4E-02	na	8.9E+00	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01		
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	na	8.9E-01	6.4E-01	na	3.3E+03	5.5E-02	1.4E-02	na	8.9E+00	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01	na	3.3E+02	4.4E-01	1.6E-01		
Endosulfan Sulfate	0	8.6E-02	3.6E-02	na	6.0E-02	2.5E-01	4.1E-01	na	2.2E+00	2.2E+02	9.0E-03	na	6.0E-03	1.7E-01	1.0E-01	na	2.2E+01	1.7E-01	1.0E-01	na	2.2E+01	1.7E-01	1.0E-01	
Erdrin	0	--	--	na	3.0E-01	--	--	na	1.1E+01	--	--	na	3.0E-02	--	--	na	1.1E+00	--	--	na	1.1E+00	--	na	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	7.8E+04	--	--	na	2.1E+02	--	--	na	7.8E+03	--	--	na	7.8E+03	
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	5.2E+03	--	--	na	1.4E+01	--	--	na	5.2E+02	--	--	na	5.2E+02	
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.0E+05	--	--	na	5.3E+02	--	--	na	2.0E+04	--	--	na	2.0E+04	
Foaming Agents	0	--	--	na	--	--	--	na	--	--	na	--	--	--	--	na	--	--	--	na	--	
Guthion	0	--	1.0E-02	na	--	1.1E-01	na	--	2.5E-03	na	--	2.9E-02	na	--	--	2.9E-02	na	--	--	na	--	
Heptachlor	C	0	5.2E-01	3.8E-03	na	7.9E-04	1.5E+00	4.3E-02	na	1.3E-01	9.5E-04	na	7.9E-05	1.0E+00	1.1E-02	na	1.3E-02	1.0E+00	1.1E-02	na	1.3E-02	
Heptachlor Epoxide	C	0	5.2E-01	3.8E-03	na	3.9E-04	1.5E+00	4.3E-02	na	6.3E-02	9.5E-04	na	3.9E-05	1.0E+00	1.1E-02	na	6.3E-03	1.0E+00	1.1E-02	na	6.3E-03	
Hexachlorobenzene	C	0	--	na	2.9E-03	--	--	na	4.7E-01	--	--	na	2.9E-04	--	--	na	4.7E-02	--	--	na	4.7E-02	
Hexachlorobutadiene	C	0	--	na	1.8E+02	--	--	na	2.9E+04	--	--	na	1.8E+01	--	--	na	2.9E+03	--	--	na	2.9E+03	
Hexachlorocyclohexane		0	--	na	4.9E-02	--	--	na	7.9E+00	--	--	na	4.9E-03	--	--	na	7.9E-01	--	--	na	7.9E-01	
Alpha-BHC	C	0	--	--	na	1.7E-01	--	--	na	2.7E+01	--	--	na	1.7E-02	--	--	na	2.7E+00	--	--	na	2.7E+00
Beta-BHC	C	0	--	--	na	1.8E+00	2.8E+00	--	na	2.9E+02	2.4E-01	--	na	1.8E-01	1.9E+00	--	na	2.9E+01	1.9E+00	--	na	2.9E+01
Hexachlorocyclohexane		0	9.5E-01	na	--	1.1E+03	--	--	na	4.1E+04	--	--	na	1.1E+02	--	--	na	4.1E+03	--	--	na	4.1E+03
Gamma-BHC (Lindane)		0	--	na	3.3E+01	--	--	na	5.3E+03	--	--	na	3.3E+00	--	--	na	5.3E+02	--	--	na	5.3E+02	
Hexachlorocyclopentadiene		0	--	na	2.0E+00	na	--	na	2.3E+01	na	--	na	5.0E-01	na	--	na	5.7E+00	na	--	na	--	
Hexachloroethane	C	0	--	na	1.8E-01	--	--	na	2.9E+01	--	--	na	1.8E-02	--	--	na	2.9E+00	--	--	na	2.9E+00	
Hydrogen Sulfide		0	--	na	--	--	--	na	1.8E-01	--	--	na	--	--	--	na	1.5E+05	--	--	na	1.5E+05	
Indeno (1,2,3-cd) pyrene	C	0	--	na	--	--	--	na	9.6E+03	--	--	na	1.5E+06	--	--	na	9.6E+02	--	--	na	9.6E+02	
Iron		0	--	na	--	--	--	na	6.0E+01	2.6E-01	na	--	5.1E+00	5.8E-01	--	na	4.1E+01	6.6E+00	--	na	--	
Isophorone	C	0	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	--	
Kepone		0	--	na	2.0E-01	2.3E-00	na	--	1.1E+01	1.1E+00	na	--	6.0E+01	2.6E-01	--	na	4.1E+01	6.6E+00	--	na	--	
Lead		0	--	1.0E-01	na	--	--	na	--	--	na	5.1E+00	5.8E-01	--	na	4.1E+01	6.6E+00	--	na	--		
Malathion		0	--	na	--	--	--	na	--	--	na	2.5E-02	na	--	na	2.9E-01	na	--	na	--		
Manganese		0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	na	--	--		
Mercury		0	1.4E-00	7.7E-01	--	--	--	na	4.1E+00	8.8E+00	--	--	3.5E-01	1.9E-01	--	na	2.8E+00	2.2E+00	--	na	--	
Methyl Bromide		0	--	na	1.5E+03	--	--	na	5.6E+04	--	--	na	1.5E+02	--	--	na	5.6E+03	--	--	na	5.6E+03	
Methylene Chloride	C	0	--	na	5.9E+03	--	--	na	9.5E+05	--	--	na	5.9E+02	--	--	na	9.5E+04	--	--	na	9.5E+04	
Methoxychlor		0	--	3.0E-02	na	--	--	na	3.4E-01	na	--	na	7.5E-03	na	--	na	8.6E-02	na	--	na	--	
Mitrex		0	--	0.0E+00	na	--	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	--	
Nickel		0	5.6E+01	6.3E+00	na	4.6E+03	1.7E+02	7.2E+01	na	1.7E+05	1.4E+01	1.6E+00	na	4.6E+02	1.1E+02	1.8E+01	na	1.7E+04	1.1E+02	1.8E+01	na	1.7E+04
Nitrate (as N)		0	--	na	--	--	--	na	6.9E+02	--	--	na	4.8E+03	--	--	na	3.0E+00	--	--	na	--	
Nitrobenzene		0	--	na	3.0E+01	--	--	na	2.6E+04	--	--	na	6.9E+01	--	--	na	2.6E+03	--	--	na	2.6E+03	
N-Nitrosodimethylamine	C	0	--	na	6.0E+01	--	--	na	9.7E+03	--	--	na	6.0E+00	--	--	na	4.9E+02	--	--	na	4.8E+02	
N-Nitrosodiphenylamine	C	0	--	na	5.1E+00	--	--	na	8.2E+02	--	--	na	5.1E-01	--	--	na	8.2E+01	--	--	na	9.7E+02	
N-Nitrosodi-n-propylamine	C	0	2.8E+01	6.6E+00	--	--	--	na	8.3E+01	7.5E+01	na	--	7.0E+00	1.7E+00	--	na	5.6E+01	1.9E+01	--	na	--	
Parathion		0	6.5E-02	1.3E-02	na	--	1.9E-01	1.5E-01	na	--	1.6E-02	3.3E-03	na	--	1.3E-01	3.7E-02	na	--	1.3E-01	3.7E-02	na	
PCB Total	C	0	--	1.4E-02	na	6.4E-04	--	1.6E-01	na	1.0E-01	--	3.5E-03	na	6.4E-05	--	4.0E-02	na	1.0E-02	4.0E-02	na	1.0E-02	
Pentachlorophenol	C	0	7.7E-03	5.9E-03	na	3.0E+01	2.3E-02	6.7E-02	na	4.8E+03	1.9E-03	1.5E-03	na	3.0E+00	1.5E-02	1.7E-02	na	4.8E+02	1.7E-02	na	4.8E+02	
Phenol		0	--	na	8.6E+05	--	--	na	3.2E+07	--	--	na	8.6E+04	--	--	na	3.2E+06	--	--	na	3.2E+06	
Pyrene		0	--	na	4.0E+03	--	--	na	1.5E+05	--	--	na	4.0E+02	--	--	na	1.5E+04	--	--	na	1.5E+04	
Radionuclides		0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--		
Gross Alpha Activity	(pCi/L)	0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--		
Beta and Photon Activity (mrem/yr)		0	--	na	4.0E+00	--	--	na	1.5E+02	--	--	na	4.0E-01	--	--	na	1.5E+01	--	--	na	1.5E+01	
Radium 226 + 228 (pCi/L)		0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--		
Uranium (ug/l)		0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--		

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wastedload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	5.9E+01	5.7E+01	na	1.6E+05	5.0E+00	1.3E+00	na	4.2E+02	4.0E+01	1.4E+01	na	1.6E+04	4.0E+01	1.4E+01	na	1.6E+04
Silver	0	3.2E-01	--	na	--	9.4E-01	--	na	--	7.9E-02	--	na	--	6.4E-01	--	na	--	6.4E-01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E-01	--	--	na	6.4E-03	--	--	na	4.0E+00	--	--	--	6.4E-02	--	--	--	6.4E+02
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	5.3E+03	--	--	na	3.3E+00	--	--	--	5.3E+02	--	--	--	5.3E+02
Thallium	0	--	--	na	4.7E-01	--	--	na	1.7E+01	--	--	na	4.7E-02	--	--	--	1.7E+00	--	--	--	1.7E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	2.2E+05	--	--	na	6.0E+02	--	--	--	2.2E+04	--	--	--	2.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	2.2E+00	2.3E+03	na	4.5E-01	1.8E-01	5.0E-05	na	2.8E-04	1.5E+00	5.7E-04	na	4.5E-02	1.5E+00	5.7E-04	na	4.5E-02
Trichloroethylene	0	4.9E-01	7.2E-02	na	--	1.4E+00	8.2E+01	na	--	1.2E-01	1.8E+02	na	--	9.3E+01	2.1E-01	na	--	9.3E-01	2.1E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E-01	--	--	na	2.6E+03	--	--	na	7.0E+00	--	--	--	2.6E+02	--	--	--	2.6E+02
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	2.6E+04	--	--	na	1.6E+01	--	--	--	2.6E+03	--	--	--	2.6E+03
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	4.8E+04	--	--	na	3.0E+01	--	--	--	4.8E+03	--	--	--	4.8E+03
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	3.9E+03	--	--	na	2.4E+00	--	--	--	3.9E+02	--	--	--	3.9E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	3.9E+03	--	--	na	2.4E+00	--	--	--	3.9E+02	--	--	--	3.9E+02
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	1.1E+02	4.2E+02	na	9.6E+05	9.1E+00	9.1E+00	na	2.6E+03	7.3E+01	1.0E+02	na	9.6E+04	7.3E+01	1.0E+02	na	9.6E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise

2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipalities

3. Metals measured as Dissolved, unless specified otherwise

4. "C" indicates a carcinogenic parameter

5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.

Antidegradation WLAs are based upon a complete mix.

6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic

= (0.1(WQC - background conc.) + background conc.) for human health

7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.4E-03
Arsenic	2.6E-02
Barium	na
Cadmium	6.5E-01
Chromium III	4.1E+01
Chromium VI	1.3E+01
Copper	2.9E+00
Iron	na
Lead	4.0E+00
Manganese	na
Mercury	1.1E+00
Nickel	1.1E+01
Selenium	8.6E+00
Silver	2.6E-01
Zinc	2.9E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .075 MGD
Stream 7Q10 = .78 MGD
Stream 30Q10 = 1.6 MGD
Stream 1Q10 = .53 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

→ low flow

Mixing Zone Predictions @ 7Q10

Depth = .1858 ft
Length = 3373.96 ft
Velocity = .3561 ft/sec
Residence Time = .1097 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2792 ft
Length = 2388.85 ft
Velocity = .4643 ft/sec
Residence Time = .0595 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1508 ft
Length = 4026.22 ft
Velocity = .3105 ft/sec
Residence Time = 3.6016 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 27.77% of the 1Q10 is used.

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .075 MGD
Stream 7Q10 = 10 MGD
Stream 30Q10 = 13.8 MGD
Stream 1Q10 = 8.5 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

> high flow

Mixing Zone Predictions @ 7Q10

Depth = .8369 ft
Length = 923.84 ft
Velocity = .9318 ft/sec
Residence Time = .0115 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.0208 ft
Length = 774.12 ft
Velocity = 1.052 ft/sec
Residence Time = .0085 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .7575 ft
Length = 1008.76 ft
Velocity = .8762 ft/sec
Residence Time = .3198 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Field_pH June through November

6.75	8/7/2003
7.96	6/22/2004
8.07	8/10/2004
6.78	8/30/2004
7.1	9/28/2004
7.06	10/14/2004
6.63	11/30/2004

8.004 90th percentile pH

Temperature Data -June through November

22.52	8/7/03
21.53	6/22/04
21.73	8/10/04
24.8	8/30/04
18.4	9/28/04
13.57	10/14/04
8.2	11/30/04

23.432 90th percentile temp

Annual pH

7.9	4/16/2003
6.65	5/21/2003
7.11	2/26/2004
6.92	12/14/2004
6.8	12/16/2004
6.79	3/8/2005
7.75	3/23/2005
6.8	4/13/2005
6.75	8/7/2003
7.96	6/22/2004
8.07	8/10/2004
6.78	8/30/2004
7.1	9/28/2004
7.06	10/14/2004
6.63	11/30/2004

7.936 90th percentile pH

Attachment 7

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Boston Water & Sewer STP - 0.15 MGDN

New Facility Permit No.: VA0088749

Receiving Stream: Hazel River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO ₃) =	25 mg/L	1Q10 (Annual) =	0.53 MGD	Annual - 1Q10 Mix =	30.87 %
90% Temperature (Annual) =	23.4 deg C	7Q10 (Annual) =	0.78 MGD	-7Q10 Mix =	100 %
90% Temperature (Wet season) =	15.7 deg C	3QQ10 (Annual) =	1.6 MGD	-3Q10 Mix =	100 %
90% Maximum pH =	7.9 SU	1Q10 (Wet season) =	8.5 MGD	Wet Season - 1Q10 Mix =	100 %
10% Maximum pH =	SU	3Q10 (Wet season) =	13.8 MGD	-3Q10 Mix =	100 %
Tier Designation (1 or 2) =	2	3QQ5 =	2.7 MGD	Discharge Flow =	0.15 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	12 MGD		
Troub Present Y/N? =	n				
Early Life Stages Present Y/N? =	y				

Stream Flows

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	na	1.9E+04	--	na	9.9E+01	--	na	1.9E+03	--	na	1.9E+03
Acrolein	0	--	--	na	9.3E+00	--	na	1.8E+02	--	na	9.3E-01	--	na	1.8E+01	--	na	1.8E+01
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	na	2.0E+02	--	na	2.5E-01	--	na	2.0E+01	--	na	2.0E+01
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	6.3E+00	--	na	4.1E-02	7.5E-01	--	na	5.0E-05	3.4E+00	--	na	4.1E-03
Ammonia-N (mg/l) (Yearly)	0	1.01E+01	1.58E+00	na	--	2.1E+01	1.8E+01	na	--	2.53E+00	3.95E-01	na	--	1.1E+01	4.6E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.01E+01	2.59E+00	na	--	5.6E+02	2.4E+02	na	--	2.53E+00	6.48E-01	na	--	1.5E+02	6.0E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	na	7.6E+05	--	na	4.0E+03	--	na	7.6E+04	--	na	7.6E+04
Antimony	0	--	--	na	6.4E+02	--	na	1.2E+04	--	na	6.4E+01	--	na	1.2E+03	--	na	1.2E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	7.1E+02	9.3E+02	na	--	8.5E+01	3.8E+01	na	--	3.9E+02	2.3E+02	na	--
Barium	0	--	--	na	--	--	na	--	--	na	--	--	na	--	--	na	--
Benzene ^c	0	--	--	na	5.1E+02	--	na	4.1E+04	--	na	5.1E+01	--	na	4.1E+03	--	na	4.1E+03
Benzidine ^c	0	--	--	na	2.0E-03	--	na	1.6E-01	--	na	2.0E-04	--	na	1.6E-02	--	na	1.6E-02
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Benzo (K) fluoranthene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Bis(2-Chloroethyl Ether) ^c	0	--	--	na	5.3E+00	--	na	4.3E+02	--	na	5.3E-01	--	na	4.3E+01	--	na	4.3E+01
Bis(2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	na	1.2E+06	--	na	6.5E+03	--	na	1.2E+05	--	na	1.2E+05
Bis(2-Ethyhexyl Phthalate) ^c	0	--	--	na	2.2E+01	--	na	1.8E+03	--	na	2.2E+00	--	na	1.8E+02	--	na	1.8E+02
Boronform ^c	0	--	--	na	1.4E+03	--	na	1.1E+05	--	na	1.4E+02	--	na	1.1E+04	--	na	1.1E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	na	3.6E+04	--	na	1.9E+02	--	na	3.6E+03	--	na	3.6E+03
Cadmium	0	8.2E-01	3.8E-01	na	--	1.7E+00	2.4E+00	na	--	2.1E-01	9.5E-02	na	--	9.3E-01	5.9E-01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	na	1.3E+03	--	na	1.6E+00	--	na	1.3E+02	--	na	1.3E+02
Chlordane ^c	0	2.4E-00	4.3E-03	na	8.1E-03	5.0E+00	2.7E-02	na	6.6E-01	6.0E-01	1.1E-03	na	8.1E-04	2.7E+00	6.7E-03	na	6.6E-02
Chloride	0	8.6E-05	2.3E-05	na	--	1.8E+06	1.4E+06	na	--	2.2E+05	5.8E+04	na	--	9.7E+05	3.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	4.0E+01	6.8E+01	na	--	4.8E+00	2.8E+00	na	--	2.2E+01	1.7E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	na	3.0E+04	--	na	1.6E+02	--	na	3.0E+03	--	na	3.0E+03

Effluent Information

Mean Hardness (as CaCO ₃) =	25 mg/L
90% Temperature (Annual) =	23.4 deg C
90% Temperature (Wet season) =	15.7 deg C
90% Maximum pH =	7.9 SU
10% Maximum pH =	SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	n
Troub Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Parameter (ug/l unless noted)	Background Conc.	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	na	1.9E+04	--	na	9.9E+01	--	na	1.9E+03	--	na	1.9E+03
Acrolein	0	--	--	na	9.3E+00	--	na	1.8E+02	--	na	9.3E-01	--	na	1.8E+01	--	na	1.8E+01
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	na	2.0E+02	--	na	2.5E-01	--	na	2.0E+01	--	na	2.0E+01
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	6.3E+00	--	na	4.1E-02	7.5E-01	--	na	5.0E-05	3.4E+00	--	na	4.1E-03
Ammonia-N (mg/l) (Yearly)	0	1.01E+01	1.58E+00	na	--	2.1E+01	1.8E+01	na	--	2.53E+00	3.95E-01	na	--	1.1E+01	4.6E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.01E+01	2.59E+00	na	--	5.6E+02	2.4E+02	na	--	2.53E+00	6.48E-01	na	--	1.5E+02	6.0E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	na	7.6E+05	--	na	4.0E+03	--	na	7.6E+04	--	na	7.6E+04
Antimony	0	--	--	na	6.4E+02	--	na	1.2E+04	--	na	6.4E+01	--	na	1.2E+03	--	na	1.2E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	7.1E+02	9.3E+02	na	--	8.5E+01	3.8E+01	na	--	3.9E+02	2.3E+02	na	--
Barium	0	--	--	na	--	--	na	--	--	na	--	--	na	--	--	na	--
Benzene ^c	0	--	--	na	5.1E+02	--	na	4.1E+04	--	na	5.1E+01	--	na	4.1E+03	--	na	4.1E+03
Benzidine ^c	0	--	--	na	2.0E-03	--	na	1.6E-01	--	na	2.0E-04	--	na	1.6E-02	--	na	1.6E-02
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Benzo (K) fluoranthene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	na	1.5E+01	--	na	1.8E-02	--	na	1.5E+00	--	na	1.5E+00
Bis(2-Chloroethyl Ether) ^c	0	--	--	na	5.3E+00	--	na	4.3E+02	--	na	5.3E-01	--	na	4.3E+01	--	na	4.3E+01
Bis(2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	na	1.2E+06	--	na	6.5E+03	--	na	1.2E+05	--	na	1.2E+05
Bis(2-Ethyhexyl Phthalate) ^c	0	--	--	na	2.2E+01	--	na	1.8E+03	--	na	2.2E+00	--	na	1.8E+02	--	na	1.8E+02
Boronform ^c	0	--	--	na	1.4E+03	--	na	1.1E+05	--	na	1.4E+02	--	na	1.1E+04	--	na	1.1E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	na	3.6E+04	--	na	1.9E+02	--	na	3.6E+03	--	na	3.6E+03
Cadmium	0	8.2E-01	3.8E-01	na	--	1.7E+00	2.4E+00	na	--	2.1E-01	9.5E-02	na	--	9.3E-01	5.9E-01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	na	1.3E+03	--	na	1.6E+00	--	na	1.3E+02	--	na	1.3E+02
Chlordane ^c	0	2.4E-00	4.3E-03	na	8.1E-03	5.0E+00	2.7E-02	na	6.6E-01	6.0E-01	1.1E-03	na	8.1E-04	2.7E+00	6.7E-03	na	6.6E-02
Chloride	0	8.6E-05	2.3E-05	na	--	1.8E+06	1.4E+06	na	--	2.2E+05	5.8E+04	na	--	9.7E+05	3.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	4.0E+01	6.8E+01	na	--	4.8E+00	2.8E+00	na	--	2.2E+01	1.7E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	na	3.0E+04	--	na	1.6E+02	--	na	3.0E+03	--	na	3.0E+03

Parameter	Background	Water Quality Criteria												Antidegradation Allocations																
		Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations																
		Conc.	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH					
chlorodibromomethane ^c	0	--	--	--	na	1.3E+02	--	--	na	1.1E+04	--	--	--	na	1.3E+01	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--					
chloroform	0	--	--	--	na	1.1E+04	--	--	na	2.1E+05	--	--	--	na	1.1E+03	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--					
Chloronaphthalene	0	--	--	--	na	1.6E+03	--	--	na	3.0E+04	--	--	--	na	1.6E+02	--	--	na	3.0E+03	--	--	na	3.0E+03	--	--					
Chlorophenol	0	--	--	--	na	1.5E+02	--	--	na	2.9E+03	--	--	--	na	1.5E+01	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--					
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	2.5E-01	na	--	2.1E-02	1.0E-02	na	--	9.4E-02	6.4E-02	na	--	9.4E-02	6.4E-02	na	--	9.4E-02	6.4E-02	na	--					
chromium III	0	1.8E+02	2.4E+01	na	--	3.8E+02	1.5E+02	na	--	4.6E-01	6.0E+00	na	--	2.1E+02	3.7E+01	na	--	2.1E+02	3.7E+01	na	--	2.1E+02	3.7E+01	na	--					
chromium VI	0	1.6E+01	1.1E+01	na	--	3.3E+01	6.8E+01	na	--	4.0E+00	2.8E+00	na	--	1.8E+01	1.7E+01	na	--	1.8E+01	1.7E+01	na	--	1.8E+01	1.7E+01	na	--					
chromium, Total	0	--	--	1.0E+02	--	--	na	--	--	na	1.0E+01	--	--	1.9E+02	--	--	1.9E+02	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--			
hydrogen c	0	--	--	na	1.8E-02	--	--	na	1.5E+00	--	--	na	1.8E-03	--	--	na	1.5E-01	--	--	na	1.5E-01	--	--	na	1.5E-01	--	--			
copper	0	3.6E+00	2.7E+00	na	--	7.6E+00	1.7E+01	na	--	9.1E-01	6.8E-01	na	--	4.1E+00	4.2E+00	na	--	4.1E+00	4.2E+00	na	--	4.1E+00	4.2E+00	na	--					
yanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.6E+01	3.2E+01	na	3.0E+05	5.5E+00	1.3E+00	na	1.6E+03	8.1E+00	na	--	3.0E+04	2.5E+01	8.1E+00	na	3.0E+04	2.5E+01	8.1E+00	na	3.0E+04	2.5E+01	8.1E+00	na		
DD c	0	--	--	na	3.1E-03	--	--	na	2.5E-01	--	--	na	3.1E-04	--	--	na	2.5E-02	--	--	na	2.5E-02	--	--	na	2.5E-02	--	--			
DE c	0	--	--	na	2.2E-03	--	--	na	1.8E-01	2.8E-01	2.5E-04	na	2.2E-04	--	--	na	1.8E-02	1.2E+00	1.6E-03	na	1.8E-02	1.2E+00	1.6E-03	na	1.8E-02	1.2E+00	1.6E-03	na		
DT c	0	1.1E+00	1.0E-03	na	2.2E-03	2.3E+00	6.2E-03	na	1.8E-01	2.8E-01	2.5E-04	na	2.2E-04	1.2E+00	1.6E-03	na	1.8E-02	1.2E+00	1.6E-03	na	1.8E-02	1.2E+00	1.6E-03	na	1.8E-02	1.2E+00	1.6E-03	na		
emeton	0	--	--	1.0E-01	na	--	6.2E-01	na	--	2.5E-02	na	--	1.6E-01	na	--	1.6E-01	na	--	1.6E-01	na	--	1.6E-01	na	--	1.6E-01	na	--	1.6E-01	na	--
flazinon	0	1.7E-01	1.7E-01	na	--	3.6E-01	1.1E-00	na	--	4.3E-02	4.3E-02	na	--	1.9E-01	2.6E-01	na	--	1.9E-01	2.6E-01	na	--	1.9E-01	2.6E-01	na	--	1.9E-01	2.6E-01	na	--	
benz[a]hantracene c	0	--	--	na	1.8E-01	--	--	na	1.5E+01	--	--	na	1.8E-02	--	--	na	1.5E+00	--	--	na	1.5E+00	--	--	na	1.5E+00	--	--			
2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.5E+04	--	--	na	1.3E+02	--	--	na	2.5E+03	--	--	na	2.5E+03	--	--	na	2.5E+03	--	--			
3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.8E+04	--	--	na	9.6E+01	--	--	na	1.8E+03	--	--	na	1.8E+03	--	--	na	1.8E+03	--	--			
4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.6E+03	--	--	na	1.9E+01	--	--	na	3.6E+02	--	--	na	3.6E+02	--	--	na	3.6E+02	--	--			
3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	2.3E+01	--	--	na	2.8E-02	--	--	na	2.3E+00	--	--	na	2.3E+00	--	--	na	2.3E+00	--	--			
chlorobromomethane c	0	--	--	na	1.7E+02	--	--	na	1.4E+04	--	--	na	1.7E+01	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--			
2-Dichloroethane c	0	--	--	na	3.7E+02	--	--	na	3.0E+04	--	--	na	3.7E+01	--	--	na	3.0E+03	--	--	na	3.0E+03	--	--	na	3.0E+03	--	--			
1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.3E+05	--	--	na	7.1E+02	--	--	na	1.3E+04	--	--	na	1.3E+04	--	--	na	1.3E+04	--	--			
2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.9E+05	--	--	na	1.0E+03	--	--	na	1.9E+04	--	--	na	1.9E+04	--	--	na	1.9E+04	--	--			
4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.5E+03	--	--	na	2.9E+01	--	--	na	5.5E+02	--	--	na	5.5E+02	--	--	na	5.5E+02	--	--			
4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	na	--	--	na	--	--	na	--	--	na	--	--	
2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	1.2E+04	--	--	na	1.5E+01	--	--	na	1.2E+03	--	--	na	1.2E+03	--	--	na	1.2E+03	--	--			
3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	1.7E+04	--	--	na	2.1E+01	--	--	na	1.7E+03	--	--	na	1.7E+03	--	--	na	1.7E+03	--	--			
ieldiimidin c	0	2.4E-01	5.6E-02	na	5.4E-04	5.0E-01	3.5E-01	na	4.4E-02	6.0E-02	1.4E-02	na	5.4E-05	2.7E-01	8.7E-02	na	4.4E-03	2.7E-01	8.7E-02	na	4.4E-03	2.7E-01	8.7E-02	na	4.4E-03	2.7E-01	8.7E-02	na		
ilethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.4E+05	--	--	na	4.4E+03	--	--	na	8.4E+04	--	--	na	8.4E+04	--	--	na	8.4E+04	--	--			
4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.6E+04	--	--	na	8.5E+01	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--			
lmetimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.1E+07	--	--	na	1.1E+05	--	--	na	2.1E+06	--	--	na	2.1E+06	--	--	na	2.1E+06	--	--			
l(i-1-Bu) Phthalate	0	--	--	na	4.5E+03	--	--	na	8.6E+04	--	--	na	4.5E+02	--	--	na	8.6E+03	--	--	na	8.6E+03	--	--	na	8.6E+03	--	--			
4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.0E+05	--	--	na	5.3E+02	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--			
Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.3E+03	--	--	na	2.8E+01	--	--	na	5.3E+02	--	--	na	5.3E+02	--	--	na	5.3E+02	--	--			
4-Dinitrotoluene c	0	--	--	na	3.4E+01	--	--	na	2.8E+03	--	--	na	3.4E+00	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--			
ioxin 2,3,7,8-tetrachlorobenzzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	9.7E-07	--	--	na	5.1E-09	--	--	na	9.7E-08	--	--	na	9.7E-08	--	--	na	9.7E-08	--	--			
2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	1.6E+02	--	--	na	2.0E-01	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--			
lpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.6E-01	3.5E-01	na	1.7E+03	5.5E-02	1.4E-02	na	8.9E+00	2.5E-01	8.7E-02	na	1.7E+02	2.5E-02	8.7E-02	na	1.7E+02	2.5E-02	8.7E-02	na	1.7E+02	2.5E-02	8.7E-02	na		
lndosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.7E+03	--	--	na	8.9E+00	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--			
lndin	0	--	--	na	6.0E-02	1.8E-01	2.2E-01	na	1.1E+00	2.2E-02	9.0E-03	na	6.0E-03	9.7E-02	5.6E-02	na	1.1E-01	9.7E-02	5.6E-02	na	1.1E-01	9.7E-02	5.6E-02	na	1.1E-01	9.7E-02	5.6E-02	na		
ndrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	5.7E+00	--	--	na	3.0E-02	--	--	na	5.7E-01	--	--	na	5.7E-01	--	--	na	5.7E-01	--	--			

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.0E+04	--	--	na	2.1E+02	--	--	na	4.0E+03	--	--	na	4.0E+03	
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.7E+03	--	--	na	1.4E+01	--	--	na	2.7E+02	--	--	na	2.7E+02	
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.0E+05	--	--	na	5.3E+02	--	--	na	1.0E+04	--	--	na	1.0E+04	
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	
Gulhion	0	--	1.0E+02	na	--	6.2E-02	na	--	2.5E-03	na	--	na	1.6E-02	na	--	na	1.6E-02	na	--	na	--	
Heptachlor	C	0	5.2E+01	3.8E+03	na	7.9E-04	1.1E+00	2.4E-02	na	6.4E-02	1.3E-01	9.5E-04	na	7.9E-05	5.9E-01	5.9E-03	na	5.9E-01	5.9E-03	na	6.4E-03	
Heptachlor Epoxide	C	0	5.2E+01	3.8E+03	na	3.9E-04	1.1E+00	2.4E-02	na	3.2E-02	1.3E-01	9.5E-04	na	3.9E-05	5.9E-01	5.9E-03	na	3.2E-03	5.9E-03	na	3.2E-03	
Hexachlorobenzene	C	0	--	na	2.9E-03	--	--	na	2.8E-01	--	--	na	2.9E-04	--	--	na	2.3E-02	--	--	na	2.3E-02	
Hexachlorobutadiene	C	0	--	na	1.8E+02	--	--	na	1.5E+04	--	--	na	1.8E+01	--	--	na	1.5E+03	--	--	na	1.5E+03	
Hexachlorocyclohexane	C	0	--	na	4.9E-02	--	--	na	4.0E+00	--	--	na	4.9E-03	--	--	na	4.0E-01	--	--	na	4.0E-01	
Alpha-BHC	C	0	--	na	1.7E-01	--	--	na	1.4E+01	--	--	na	1.7E-02	--	--	na	1.4E+00	--	--	na	1.4E+00	
Heptachloroclohexane		0	--	na	1.8E+00	2.0E+00	--	na	1.5E+02	2.4E-01	--	na	1.8E-01	1.1E+00	--	na	1.5E+01	1.1E+00	--	na	1.5E+01	
Heptachlorocyclohexane		0	9.5E-01	na	1.8E+00	2.0E+00	--	na	2.1E+04	--	--	na	1.1E+02	--	--	na	2.1E+03	--	--	na	2.1E+03	
Gamma-BHC	C	0	--	na	1.1E+03	--	--	na	2.7E+03	--	--	na	3.3E+00	--	--	na	2.7E+02	--	--	na	2.7E+02	
Heptachlorocyclopentadiene		0	--	na	3.3E+01	--	--	na	1.2E+01	--	--	na	5.0E-01	--	--	na	3.1E+00	--	--	na	3.1E+00	
Heptachloroethane	C	0	--	na	2.0E+00	--	--	na	1.8E-01	--	--	na	1.5E+01	--	--	na	1.5E+00	--	--	na	1.5E+00	
Hydrogen Sulfide		0	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	
Indeno (1,2,3-cd) pyrene	C	0	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	
Iron		0	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	
Isophorone	C	0	--	na	9.6E+03	--	--	na	7.8E+05	--	--	na	9.6E+02	--	--	na	7.8E+04	--	--	na	7.8E+04	
Kepone		0	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	--	
Lead		0	2.0E+01	2.3E+00	na	--	4.3E+01	1.4E+01	na	--	5.1E+00	5.8E-01	na	--	2.3E+01	3.6E+00	na	--	2.3E+01	3.6E+00	na	--
Malathion		0	--	1.0E-01	na	--	--	6.2E-01	na	--	2.5E-02	na	--	--	1.6E-01	na	--	--	1.6E-01	na	--	
Manganese		0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	--	
Mercury		0	1.4E+00	7.7E-01	--	--	2.9E+00	4.8E+00	--	--	3.5E-01	1.9E-01	--	--	1.6E+00	1.2E+00	--	--	1.6E+00	1.2E+00	--	--
Methyl Bromide		0	--	na	1.5E+03	--	--	na	2.9E+04	--	--	na	1.5E+02	--	--	na	2.9E+03	--	--	na	2.9E+03	
Methylene Chloride	C	0	--	na	5.9E+03	--	--	na	4.8E+05	--	--	na	5.9E+02	--	--	na	4.8E+04	--	--	na	4.8E+04	
Methoxychlor		0	--	na	3.0E-02	--	--	na	1.9E-01	--	--	na	7.5E-03	--	--	na	4.7E-02	--	--	na	4.7E-02	
Mirex		0	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	
Nickel	0	5.6E+01	6.3E+00	na	4.6E+03	1.2E+02	3.9E+01	na	8.7E+04	1.4E+01	1.6E+00	na	4.6E+02	6.4E+01	9.7E+00	na	8.7E+03	6.4E+01	9.7E+00	na	8.7E+03	
Nitrate (as N)		0	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--	
Nitrobenzene		0	--	na	6.9E+02	--	--	na	1.3E+04	--	--	na	6.9E+01	--	--	na	1.3E+03	--	--	na	1.3E+03	
N-Nitrosodimethylamine	C	0	--	na	3.0E+01	--	--	na	2.4E+03	--	--	na	3.0E+00	--	--	na	2.4E+02	--	--	na	2.4E+02	
N-Nitrosodiphenylamine	C	0	--	na	6.0E+01	--	--	na	4.9E+03	--	--	na	6.0E+00	--	--	na	4.9E+02	--	--	na	4.9E+02	
N-Nitrosodi-n-propylamine	C	0	--	na	5.1E+00	--	--	na	4.1E+02	--	--	na	5.1E-01	--	--	na	4.1E+01	--	--	na	4.1E+01	
Nonyphenol		0	2.8E+01	6.6E+00	--	--	5.9E-01	4.1E+01	na	--	7.0E+00	1.7E+00	--	--	3.2E+01	1.0E+01	--	--	3.2E+01	1.0E+01	na	--
Parathion		0	6.5E-02	1.3E-02	na	--	1.4E-01	8.1E-02	na	--	1.6E-02	3.3E-03	na	--	7.4E-02	2.0E-02	na	--	7.4E-02	2.0E-02	na	--
PCB Total	C	0	--	1.4E-02	na	6.4E-04	--	8.7E-02	na	5.2E-02	--	3.5E-03	na	6.4E-05	--	2.2E-02	na	5.2E-03	--	2.2E-02	na	5.2E-03
Pentachlorophenol	C	0	7.7E-03	5.9E-03	na	3.0E+01	1.6E-02	3.7E-02	na	2.4E+03	1.9E-03	1.5E-03	na	3.0E+00	8.7E-03	9.1E-03	na	2.4E+02	8.7E-03	9.1E-03	na	2.4E+02
Phenol		0	--	na	8.6E+05	--	--	na	1.6E+07	--	--	na	8.6E+04	--	--	na	1.6E+06	--	--	na	1.6E+06	
Pyrene		0	--	na	4.0E+03	--	--	na	7.6E+04	--	--	na	4.0E+02	--	--	na	7.6E+03	--	--	na	7.6E+03	
Radionuclides		0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	--	
Gross Alpha Activity	(pCi/L)	0	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	--	
Beta and Photon Activity	(mrem/y)	0	--	na	4.0E+00	--	--	na	7.6E+01	--	--	na	4.0E-01	--	--	na	7.6E+00	--	--	na	7.6E+00	
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	--	
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	--	

Parameter	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	Acute	Chronic	HH	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	HH	
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	3.1E+01	na	8.0E+04	5.0E+00	1.3E+00	na	4.2E+02	2.3E+01	7.8E+00	na	8.0E+03	2.3E+01	7.8E+00
Silver	0	3.2E-01	—	na	—	6.6E-01	—	na	—	7.9E-02	—	na	—	3.6E-01	—	na	—	3.6E-01
Sulfate	0	—	—	na	—	—	na	—	—	—	na	—	—	—	—	—	—	—
1,1,2,2-Tetrachloroethane ^C	0	—	—	na	4.0E+01	—	—	na	3.2E+03	—	—	na	4.0E+00	—	—	na	3.2E+02	—
Tetrachloroethylene ^C	0	—	—	na	3.3E+01	—	—	na	2.7E+03	—	—	na	3.3E+00	—	—	na	2.7E+02	—
Thallium	0	—	—	na	4.7E+01	—	—	na	8.9E+00	—	—	na	4.7E+02	—	—	na	8.9E+01	—
Toluene	0	—	—	na	6.0E+03	—	—	na	1.1E+05	—	—	na	6.0E+02	—	—	na	1.1E+04	—
Total dissolved solids	0	—	—	na	—	—	na	—	—	—	na	—	—	—	—	—	—	—
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	1.2E-03	na	2.3E-01	1.8E-01	5.0E-05	na	2.8E-04	8.3E-01	3.1E-04	na	2.3E-02	3.1E-04
Tributyltin	0	4.6E-01	7.2E-02	na	—	9.6E-01	4.5E-01	na	—	1.2E-01	1.8E-02	na	—	5.2E-01	1.1E-01	na	—	5.2E-01
1,2,4-Trichlorobenzene	0	—	—	na	7.0E+01	—	—	na	1.3E+03	—	—	na	7.0E+00	—	—	na	1.3E+02	—
1,1,2-Trichloroethane ^C	0	—	—	na	1.6E-02	—	—	na	1.3E-04	—	—	na	1.6E-01	—	—	na	1.3E+03	—
Trichloroethylene ^C	0	—	—	na	3.0E+02	—	—	na	2.4E+04	—	—	na	3.0E+01	—	—	na	2.4E+03	—
2,4,6-Trichlorophenol ^C	0	—	—	na	2.4E+01	—	—	na	1.9E+03	—	—	na	2.4E+00	—	—	na	1.9E+02	—
2-(2,4,5-Trichlorophenoxy) propionic acid (Silver)	0	—	—	na	—	—	na	—	—	—	na	—	—	—	—	—	—	—
Vinyl Chloride ^C	0	—	—	na	2.4E+01	—	—	na	1.9E+03	—	—	na	2.4E+00	—	—	na	1.9E+02	—
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	7.6E+01	2.3E+02	na	4.9E+05	9.1E+00	9.1E+00	na	2.6E+03	4.1E+01	5.7E+01	na	4.9E+04	5.7E+01

Notes:

- All concentrations expressed as micrograms/liter ($\mu\text{g/l}$), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.

Antidegradation WLAs are based upon a complete mix.

- Antideg. Baseline = $(0.25(\text{WQC} - \text{background conc.}) + \text{background conc.})$ for acute and chronic
= $(0.1(\text{WQC} - \text{background conc.}) + \text{background conc.})$ for human health

- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Metal	Target Value (SSTV)
Antimony	1.2E+03
Arsenic	1.4E+02
Barium	na
Cadmium	3.6E-01
Chromium III	2.2E+01
Chromium VI	7.3E+00
Copper	1.7E+00
Iron	na
Lead	2.2E+00
Manganese	na
Mercury	6.3E-01
Nickel	5.8E+00
Selenium	4.7E+00
Silver	1.4E-01
Zinc	1.6E+01

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .15 MGD
Stream 7Q10 = .78 MGD
Stream 30Q10 = 1.6 MGD
Stream 1Q10 = .53 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

→ low flow

Mixing Zone Predictions @ 7Q10

Depth = .1955 ft
Length = 3232.01 ft
Velocity = .3681 ft/sec
Residence Time = .1016 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2867 ft
Length = 2335.62 ft
Velocity = .4724 ft/sec
Residence Time = .0572 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1618 ft
Length = 3792.27 ft
Velocity = .3252 ft/sec
Residence Time = 3.2389 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 30.87% of the 1Q10 is used.

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .15 MGD
Stream 7Q10 = 10 MGD
Stream 30Q10 = 13.8 MGD
Stream 1Q10 = 8.5 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

> high flow

Mixing Zone Predictions @ 7Q10

Depth = .8407 ft
Length = 920.14 ft
Velocity = .9344 ft/sec
Residence Time = .0114 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.0243 ft
Length = 771.8 ft
Velocity = 1.0541 ft/sec
Residence Time = .0085 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .7615 ft
Length = 1004.03 ft
Velocity = .8791 ft/sec
Residence Time = .3173 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Attachment 8

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Boston Water & Sewer STP - 0.25 MGDNew Facility Permit No.: VA0088749

Receiving Stream: Hazel River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows						Mixing Information						Effluent Information			
		1Q10 (Annual) =	0.53 MGD	Annual - 1Q10 Mix =	34.96 %	Mean Hardness (as CaCO ₃) =	25 mg/L	90% Temp (Annual) =	100 %	90% Temp (Wet season) =	100 %	90% Maximum pH =	15.7 deg C				
Mean Hardness (as CaCO ₃) =		25 mg/L	7Q10 (Annual) =	0.78 MGD	-7Q10 Mix =	100 %	90% Temp (Annual) =	23.4 deg C									
90% Temperature (Annual) =		23.4 deg C	30Q10 (Annual) =	1.6 MGD	-30Q10 Mix =	100 %	90% Temp (Wet season) =	15.7 deg C									
90% Temperature (Wet season) =		15.7 deg C	1Q10 (Wet season) =	8.5 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	7.9 SU									
90% Maximum pH =		7.9 SU	30Q10 (Wet season)	13.8 MGD	-30Q10 Mix =	100 %	10% Maximum pH =	SU									
10% Maximum pH =		SU	30Q5 =	2.7 MGD			Discharge Flow =	0.25 MGD									
Tier Designation (1 or 2) =		2															
Public Water Supply (PWS) Y/N? =		n															
Trout Present Y/N? =		n															
Early Life Stages Present Y/N? =		y															

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria						Wasteload Allocations						Antidegradation Baseline						Antidegradation Allocations						Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH						
Aceanaphthene	0	--	--	na	9.9E+02	--	--	na	1.2E+04	--	--	na	9.9E+01	--	--	na	1.2E+03	--	--	na	1.2E+03	--	--	na	1.1E+01	--	--				
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.1E+02	--	--	na	9.3E+01	--	--	na	1.1E+01	--	--	na	1.1E+01	--	--	na	1.1E+01	--	--				
Acrylonitrile ^C	0	--	--	na	2.5E+00	--	--	na	1.2E+02	--	--	na	2.5E+01	--	--	na	1.2E+01	--	--	na	1.2E+01	--	--	na	1.2E+01	--	--				
Adrin ^C	0	3.0E+00	--	na	5.0E+04	5.2E+00	--	na	2.5E+02	7.5E+01	--	na	5.0E+05	2.3E+00	--	na	2.5E+03	2.3E+00	--	na	2.5E+03	2.3E+00	--	na	2.5E+03	2.3E+00	--				
Ammonia-N (mg/l) (Yearly)	0	1.01E+01	1.58E+00	na	--	1.8E+01	1.2E+01	na	--	2.53E+00	3.95E+01	na	--	7.9E+00	2.9E+00	na	--	7.9E+00	2.9E+00	na	--	7.9E+00	2.9E+00	na	--	7.9E+00	2.9E+00	na			
Ammonia-N (mg/l) (High Flow)	0	1.01E+01	2.59E+00	na	--	3.5E+02	1.5E+02	na	--	2.53E+00	6.48E+01	na	--	8.9E+01	3.6E+01	na	--	8.9E+01	3.6E+01	na	--	8.9E+01	3.6E+01	na	--	8.9E+01	3.6E+01	na			
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.7E+05	--	--	na	4.0E+03	--	--	na	4.7E+04	--	--	na	4.7E+04	--	--	na	4.7E+04	--	--				
Antimony	0	--	--	na	6.4E+02	--	--	na	7.6E+03	--	--	na	6.4E+01	--	--	na	7.6E+02	--	--	na	7.6E+02	--	--	na	7.6E+02	--	--				
Arsenic	0	3.4E+02	1.5E+02	na	--	5.9E+02	6.2E+02	na	--	8.5E+01	3.8E+01	na	--	2.7E+02	1.5E+02	na	--	2.7E+02	1.5E+02	na	--	2.7E+02	1.5E+02	na	--	2.7E+02	1.5E+02	na			
Barium	0	--	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	na	--	na	--	na	--	na	--	na	--	na	--		
Benzene ^C	0	--	--	na	5.1E+02	--	--	na	2.5E+04	--	--	na	5.1E+01	--	--	na	2.5E+03	--	--	na	2.5E+03	--	--	na	2.5E+03	--	--				
Benzidine ^C	0	--	--	na	2.0E+03	--	--	na	9.8E+02	--	--	na	2.0E+04	--	--	na	9.8E+03	--	--	na	9.8E+03	--	--	na	9.8E+03	--	--				
Benzo (a) anthracene ^C	0	--	--	na	1.8E+01	--	--	na	8.8E+00	--	--	na	1.8E+02	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--				
Benzo (b) fluoranthene ^C	0	--	--	na	1.8E+01	--	--	na	8.8E+00	--	--	na	1.8E+02	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--				
Benzo (k) fluoranthene ^C	0	--	--	na	1.8E+01	--	--	na	8.8E+00	--	--	na	1.8E+02	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--				
Benzo (a) pyrene ^C	0	--	--	na	1.8E+01	--	--	na	8.8E+00	--	--	na	1.8E+02	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--	na	8.8E+01	--	--				
Bis2-Chloroethyl Ether ^C	0	--	--	na	5.3E+00	--	--	na	2.6E+02	--	--	na	5.3E+01	--	--	na	2.6E+01	--	--	na	2.6E+01	--	--	na	2.6E+01	--	--				
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	7.7E+05	--	--	na	6.5E+03	--	--	na	7.7E+04	--	--	na	7.7E+04	--	--	na	7.7E+04	--	--				
Bis 2-Ethyhexyl Phthalate ^C	0	--	--	na	2.2E+01	--	--	na	1.1E+03	--	--	na	2.2E+00	--	--	na	1.1E+02	--	--	na	1.1E+02	--	--	na	1.1E+02	--	--				
Bromofom ^C	0	--	--	na	1.4E+03	--	--	na	6.9E+04	--	--	na	1.4E+02	--	--	na	6.9E+03	--	--	na	6.9E+03	--	--	na	6.9E+03	--	--				
Butylbenzylphthalate	0	8.2E-01	3.8E-01	na	1.9E+03	--	--	na	2.2E+04	--	--	na	1.9E+02	--	--	na	2.2E+03	--	--	na	2.2E+03	--	--	na	2.2E+03	--	--				
Cadmium	0	--	--	na	1.6E+01	--	--	na	7.8E+02	--	--	na	1.6E+00	--	--	na	7.8E+01	--	--	na	7.8E+01	--	--	na	7.8E+01	--	--				
Carbon Tetrachloride ^C	0	2.4E+00	4.3E-03	na	8.1E-03	4.2E+00	1.8E+02	na	4.0E+01	1.1E+03	na	8.1E-04	4.4E+03	na	4.0E+02	1.9E+00	4.4E+03	na	4.0E+02	1.9E+00	4.4E+03	na	4.0E+02	1.9E+00	4.4E+03	na	4.0E+02	1.9E+00	4.4E+03		
Chlordane ^C	0	8.6E+05	2.3E+05	na	--	1.5E+06	9.5E+05	na	--	2.2E+05	5.8E+04	na	--	6.7E+05	2.4E+05	na	--	6.7E+05	2.4E+05	na	--	6.7E+05	2.4E+05	na	--	6.7E+05	2.4E+05	na			
TRC	0	1.9E+01	1.1E+01	na	--	3.3E+01	4.5E+01	na	--	4.8E+00	2.8E+00	na	--	1.5E+01	1.1E+01	na	--	1.5E+01	1.1E+01	na	--	1.5E+01	1.1E+01	na	--	1.5E+01	1.1E+01	na			
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.9E+04	--	--	na	1.6E+02	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--				

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^c	0	--	--	na	1.3E+02	--	--	na	6.4E+03	--	--	na	1.3E+01	--	--	na	6.4E+02	--	--	na	6.4E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.3E+05	--	--	na	1.1E+03	--	--	na	1.3E+04	--	--	na	1.3E+04
2-Chlorophthalene	0	--	--	na	1.6E+03	--	--	na	1.9E+04	--	--	na	1.6E+02	--	--	na	1.9E+03	--	--	na	1.9E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.8E+03	--	--	na	1.5E+01	--	--	na	1.8E+02	--	--	na	1.8E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.4E-01	1.7E-01	na	--	2.1E-02	1.0E-02	na	--	6.5E-02	4.2E-02	na	--	6.5E-02	4.2E-02	na	--
Chromium III	0	1.8E+02	2.4E+01	na	--	3.2E+02	9.8E+01	na	--	4.6E+01	6.0E+00	na	--	1.4E+02	2.5E+01	na	--	1.4E+02	2.5E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	2.8E+01	4.5E+01	na	--	4.0E+00	2.8E+00	na	--	1.2E+01	1.1E+01	na	--	1.2E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	1.0E+01	--	--	--	--	1.2E+02	--	--	--	--	na
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	8.8E-01	--	--	na	1.8E-03	--	--	na	8.8E-02	--	--	na	8.8E-02
Copper	0	3.6E+00	2.7E+00	na	--	6.3E+00	1.1E+01	na	--	9.1E-01	6.8E-01	na	--	2.8E+00	2.8E+00	na	--	2.8E+00	2.8E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	3.8E+01	2.1E+01	na	1.9E+05	5.5E+00	1.3E+00	na	1.6E+03	1.7E+01	5.4E+00	na	1.9E+04	1.9E+04	na	--	
DDD ^c	0	--	--	na	3.1E-03	--	--	na	1.5E-01	--	--	na	3.1E-04	--	--	na	1.5E-02	--	--	na	1.5E-02
DDE ^c	0	--	--	na	2.2E-03	--	--	na	1.1E-01	--	--	na	2.2E-04	--	--	na	1.1E-02	--	--	na	1.1E-02
DDT ^c	0	1.1E+00	1.0E+03	na	2.2E-03	1.9E+00	4.1E-03	na	1.1E-01	2.8E-01	2.5E-04	na	2.2E-04	8.6E-01	1.0E-03	na	1.1E-02	8.6E-01	1.0E-03	na	1.1E-02
Demeton	0	--	1.0E-01	na	--	--	4.1E-01	na	--	--	2.5E-02	na	--	--	1.0E-01	na	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.0E-01	7.0E-01	na	--	4.3E-02	4.3E-02	na	--	1.3E-01	1.8E-01	na	--	1.3E-01	1.8E-01	na	--
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	8.8E+00	--	--	na	1.8E-02	--	--	na	8.8E-01	--	--	na	8.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.5E+04	--	--	na	1.3E+02	--	--	na	1.5E+03	--	--	na	1.5E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E-02	--	--	na	1.1E+04	--	--	na	9.6E+01	--	--	na	1.1E+03	--	--	na	1.1E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	2.2E+03	--	--	na	1.9E+01	--	--	na	2.2E+02	--	--	na	2.2E+02
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	1.4E+01	--	--	na	2.8E-02	--	--	na	1.4E+00	--	--	na	1.4E+00
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	8.3E+03	--	--	na	1.7E+01	--	--	na	8.3E+02	--	--	na	8.3E+02
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	1.8E+04	--	--	na	3.7E+01	--	--	na	1.8E+03	--	--	na	1.8E+03
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	8.4E+04	--	--	na	7.1E+02	--	--	na	8.4E+03	--	--	na	8.4E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.2E+05	--	--	na	1.0E+03	--	--	na	1.2E+04	--	--	na	1.2E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	3.4E+03	--	--	na	2.9E+01	--	--	na	3.4E+02	--	--	na	3.4E+02
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	7.4E+03	--	--	na	1.5E+01	--	--	na	7.4E+02	--	--	na	7.4E+02
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	1.0E+04	--	--	na	2.1E+01	--	--	na	1.0E+03	--	--	na	1.0E+03
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	4.2E-01	2.3E-01	na	2.6E-02	6.0E-02	1.4E-02	na	5.4E-05	1.9E-01	5.8E-02	na	2.6E-03	1.9E-01	5.8E-02	na	2.6E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	5.2E+05	--	--	na	4.4E+03	--	--	na	5.2E+04	--	--	na	5.2E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.0E+04	--	--	na	8.5E+01	--	--	na	1.0E+03	--	--	na	1.0E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.3E+07	--	--	na	1.1E+05	--	--	na	1.3E+06	--	--	na	1.3E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	5.3E+04	--	--	na	4.5E+02	--	--	na	5.3E+03	--	--	na	5.3E+03
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	6.3E+04	--	--	na	5.3E+02	--	--	na	6.3E+03	--	--	na	6.3E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	3.3E+03	--	--	na	2.8E+01	--	--	na	3.3E+02	--	--	na	3.3E+02
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	1.7E+03	--	--	na	3.4E+00	--	--	na	1.7E+02	--	--	na	1.7E+02
Dioxin 2,3,7,8-tetrachlorobiphenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	6.0E-07	--	--	na	5.1E-09	--	--	na	6.0E-08	--	--	na	6.0E-08
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	3.8E-01	2.3E-01	na	1.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.7E-01	5.8E-02	na	1.1E+02	5.8E-02	1.7E-01	na	1.1E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	3.8E-01	2.3E-01	na	1.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.7E-01	5.8E-02	na	1.1E+02	5.8E-02	1.7E-01	na	1.1E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	3.8E-01	2.3E-01	--	--	5.5E-02	1.4E-02	--	--	1.7E-01	5.8E-02	--	--	1.7E-01	5.8E-02	--	--	--
Endosulfan Sulfate	0	--	8.6E-02	3.6E-02	na	6.0E-02	1.5E-01	na	7.1E-01	2.2E-02	9.0E-03	na	6.0E-03	6.7E-02	3.7E-02	na	7.1E-02	6.7E-02	3.7E-02	na	7.1E-02
Endrin	0	--	--	na	3.0E-01	--	--	na	3.5E+00	--	--	na	3.0E-02	--	--	na	3.5E-01	--	--	na	3.5E-01

Parameter ($\mu\text{g/l}$ unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations					
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH		
Ethylbenzene	0	--	--	2.1E+03	--	--	--	2.5E+04	--	--	--	2.1E+02	--	--	--	2.5E+03	--	--	--	2.5E+03	--	--	
Fluoranthene	0	--	--	1.4E+02	--	--	--	1.7E+03	--	--	--	1.4E+01	--	--	--	1.7E+02	--	--	--	1.7E+02	--	--	
Fluorene	0	--	--	5.3E+03	--	--	--	6.3E+04	--	--	--	5.3E+02	--	--	--	6.3E+03	--	--	--	6.3E+03	--	--	
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	
Guthion	0	--	1.0E-02	na	--	4.1E-02	na	--	2.5E-03	na	--	1.0E-02	na	--	--	1.0E-02	na	--	--	1.0E-02	na	--	
Heptachlor C	0	5.2E-01	3.8E-03	na	7.9E-04	9.1E-01	1.6E-02	na	3.9E-02	1.3E-01	9.5E-04	na	7.9E-05	4.1E-01	3.9E-03	4.1E-01	3.9E-03	na	3.9E-03	4.1E-01	3.9E-03	na	
Heptachlor Epoxide ^C	0	5.2E-01	3.8E-03	na	3.9E-04	9.1E-01	1.6E-02	na	1.3E-01	9.5E-04	na	3.9E-05	4.1E-01	3.9E-03	na	1.3E-01	9.5E-04	na	1.3E-01	9.5E-04	na	1.3E-01	
Heptachlorobenzene ^C	0	--	--	na	2.9E-03	--	--	na	1.4E-01	--	--	na	2.9E-04	--	--	na	1.4E-02	--	--	na	1.4E-02	--	--
Heptachlorobutadiene ^C	0	--	--	na	1.8E+02	--	--	na	8.8E+03	--	--	na	1.8E+01	--	--	na	8.8E+02	--	--	na	8.8E+02	--	--
Heptachlorocyclohexane	0	--	--	na	4.9E-02	--	--	na	2.4E+00	--	--	na	4.9E-03	--	--	na	2.4E-01	--	--	na	2.4E-01	--	--
Heptachlorocyclohexane	0	--	--	na	1.7E-01	--	--	na	8.3E+00	--	--	na	1.7E-02	--	--	na	8.3E-01	--	--	na	8.3E-01	--	--
Beta-BHC ^C	0	--	--	na	1.8E+00	1.7E+00	--	na	8.8E+01	2.4E-01	--	na	1.8E-01	7.4E-01	--	na	8.8E+00	7.4E-01	--	na	8.8E+00	7.4E-01	--
Hexachlorocyclohexane	0	--	--	na	1.1E+03	--	--	na	1.3E+04	--	--	na	1.1E+02	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--
Gamma-BHC ^C (Lindane)	0	--	--	na	3.3E+01	--	--	na	1.6E+03	--	--	na	3.3E+00	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--
Heptachlorocyclopentadiene	0	--	--	na	2.0E+00	--	--	na	8.2E+00	--	--	na	5.0E-01	--	--	na	2.1E+00	--	--	na	2.1E+00	--	--
Hexachloroethane ^C	0	--	--	na	1.8E-01	--	--	na	8.8E+00	--	--	na	1.8E-02	--	--	na	8.8E-01	--	--	na	8.8E-01	--	--
Hydrogen Sulfide	0	--	--	na	--	--	--	na	4.7E+05	--	--	na	9.8E+02	--	--	na	4.7E+04	--	--	na	4.7E+04	--	--
Indeno (1,2,3-cd) pyrene ^C	0	--	--	na	9.6E+03	--	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--
Iron	0	--	--	na	0.0E+00	na	--	na	3.5E+01	9.5E+00	na	--	5.1E+00	5.8E-01	na	--	1.6E-01	2.4E+00	na	--	1.6E+01	2.4E+00	na
Isophorone ^C	0	--	--	na	2.0E+01	2.3E+00	na	--	4.1E-01	na	--	na	2.5E-02	na	--	na	1.0E-01	na	--	na	1.0E-01	na	--
Leponine	0	--	--	na	1.0E-01	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	
Lead	0	--	--	na	1.4E+00	7.7E-01	--	na	2.4E+00	3.2E+00	--	na	3.5E-01	1.9E-01	--	na	1.1E+00	7.9E-01	--	na	1.1E+00	7.9E-01	--
Malathion	0	--	--	na	1.5E+03	--	--	na	5.9E+03	--	--	na	1.8E+04	--	--	na	1.5E+02	--	--	na	1.8E+03	--	--
Manganese	0	--	--	na	3.0E-02	--	--	na	1.2E-01	--	--	na	3.7E-03	--	--	na	3.1E-02	--	--	na	3.1E-02	--	--
Mercury	0	--	--	na	0.0E+00	1.0E-01	--	na	2.9E+00	3.2E+00	--	na	3.5E-01	1.9E-01	--	na	0.0E+00	na	--	na	0.0E+00	na	--
Methyl Bromide	0	--	--	na	6.3E+01	6.3E+00	--	na	1.5E+03	--	--	na	2.9E+05	--	--	na	5.9E+02	--	--	na	5.9E+02	--	--
Methylene Chloride ^C	0	--	--	na	3.0E-02	--	--	na	1.0E-01	--	--	na	2.5E-01	--	--	na	3.1E-02	--	--	na	3.1E-02	--	--
Methoxychlor	0	--	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--	na	0.0E+00	na	--
Mirex	0	--	--	na	5.6E+01	4.6E+00	--	na	5.4E+04	1.4E+01	1.6E+01	na	4.6E+02	4.4E+01	6.5E+00	na	5.4E+03	4.4E+01	6.5E+00	na	5.4E+03	4.4E+01	6.5E+00
Nickel	0	--	--	na	--	--	--	na	8.1E+03	--	--	na	2.9E+05	--	--	na	5.9E+02	--	--	na	5.9E+02	--	--
Nitrate (as N)	0	--	--	na	6.9E+02	--	--	na	1.2E-01	--	--	na	6.9E+01	--	--	na	8.1E+02	--	--	na	8.1E+02	--	--
Nitrobenzene	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	na	2.9E+03	--	--	na	3.0E+00	--	--	na	3.0E+00	--	--
N-Nitrosodimethylamine ^C	0	--	--	na	5.1E+00	--	--	na	2.5E+02	--	--	na	5.1E-01	--	--	na	2.5E+01	--	--	na	2.5E+01	--	--
N-Nitrosodiphenylamine ^C	0	--	--	na	2.8E+01	6.6E-00	--	na	4.9E+01	2.7E+01	na	--	7.0E+00	1.7E+00	--	na	2.2E+01	6.8E+00	--	na	2.2E+01	6.8E+00	--
P-Parathion	0	6.5E-02	1.3E-02	na	--	1.1E-01	5.4E-02	na	--	1.6E-02	3.3E-03	na	--	5.1E-02	1.3E-02	na	--	5.1E-02	1.3E-02	na	--	5.1E-02	1.3E-02
P-CB Total ^C	0	--	1.4E-02	na	6.4E-04	--	5.8E-02	na	3.1E-02	--	3.5E-03	na	6.4E-05	--	1.4E-02	na	3.1E-03	--	1.4E-02	na	3.1E-03	--	
Pentachlorophenol ^C	0	7.7E-03	5.9E-03	na	3.0E+01	1.3E-02	2.4E-02	na	1.5E+03	1.9E-03	1.5E-03	na	3.0E+00	6.0E-03	6.1E-03	na	1.5E+02	6.0E-03	6.1E-03	na	1.5E+02	6.0E-03	6.1E-03
Phenol	0	--	--	na	4.0E+03	--	--	na	8.6E+05	--	--	na	1.0E+07	--	--	na	8.6E+04	--	--	na	1.0E+06	--	--
Pyrene	0	--	--	na	4.0E+00	--	--	na	4.7E+01	--	--	na	4.0E+02	--	--	na	4.7E+03	--	--	na	4.7E+03	--	--
Radiouclides	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--	--	
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--	--	
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--	--	
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--	--	
Uranium (ug/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--	--	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	3.5E+01	2.1E+01	na	5.0E+04	5.0E+00	1.3E+00	na	4.2E+02	1.6E+01	5.2E+00	na	5.0E+03	1.6E+01	5.2E+00	na	5.0E+03
Silver	0	3.2E-01	...	na	-	5.5E-01	...	na	--	7.9E-02	...	na	--	2.5E-01	--	na	--	2.5E-01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	2.0E+03	--	--	na	4.0E+00	--	--	--	2.0E+02	--	--	--	2.0E+02
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	1.6E+03	--	--	na	3.3E+00	--	--	--	na	1.6E+02	--	--	1.6E+02
Thallium	0	--	--	na	4.7E+01	--	--	na	5.5E+00	--	--	na	4.7E+02	--	--	--	na	5.5E+01	--	--	5.5E+01
Toluene	0	--	--	na	6.0E+03	--	--	na	7.1E+04	--	--	na	6.0E+02	--	--	--	na	7.1E+03	--	--	7.1E+03
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	1.3E+00	8.2E-04	na	1.4E-01	1.8E-01	5.0E-05	na	2.8E-04	5.7E-01	2.1E-04	na	1.4E-02	5.7E-01	2.1E-04	na	1.4E-02
Tributyltin	0	4.6E-01	7.2E-02	na	--	8.0E-01	3.0E-01	na	--	1.2E-01	1.8E-02	na	--	3.6E-01	7.4E-02	na	--	3.6E-01	7.4E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	8.3E+02	--	--	na	7.0E+00	--	--	--	na	8.3E+01	--	--	8.3E+01
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	7.8E+03	--	--	na	1.6E+01	--	--	--	na	7.8E+02	--	--	7.8E+02
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	1.5E+04	--	--	na	3.0E+01	--	--	--	na	1.5E+03	--	--	1.5E+03
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	1.2E+03	--	--	na	2.4E+00	--	--	--	na	1.2E+02	--	--	1.2E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	na	--	--	--	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	1.2E+03	--	--	na	2.4E+00	--	--	--	na	1.2E+02	--	--	1.2E+02
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	6.3E+04	1.5E+02	na	3.1E+05	9.1E+00	9.1E+00	na	2.6E+03	2.8E+01	3.8E+01	na	3.1E+04	2.8E+01	3.8E+01	na	3.1E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipalities
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.

Antidegradation WLAs are based upon a complete mix.

6. Antideg. Baseline = $(0.25(WQC - \text{background conc.}) + \text{background conc.})$ for acute and chronic
 $= (0.1(WQC - \text{background conc.}) + \text{background conc.})$ for human health

- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to 1 and 100% mix.

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Metal	Target Value (SSTV)
Antimony	7.6E+02
Arsenic	9.3E+01
Barium	na
Cadmium	2.4E+01
Chromium III	1.5E+01
Chromium VI	5.0E+00
Copper	1.1E+00
Iron	na
Lead	1.4E+00
Manganese	na
Mercury	4.4E-01
Nickel	3.9E+00
Selenium	3.1E+00
Silver	9.9E-02
Zinc	1.1E+01

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .25 MGD
Stream 7Q10 = .78 MGD
Stream 30Q10 = 1.6 MGD
Stream 1Q10 = .53 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

→ low flow

Mixing Zone Predictions @ 7Q10

Depth = .208 ft
Length = 3067.32 ft
Velocity = .3833 ft/sec
Residence Time = .0926 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2966 ft
Length = 2269.06 ft
Velocity = .4828 ft/sec
Residence Time = .0544 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1758 ft
Length = 3535.93 ft
Velocity = .3434 ft/sec
Residence Time = 2.8603 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 34.96% of the 1Q10 is used.

Mixing Zone Predictions for

Boston W&S New Facility

Effluent Flow = .25 MGD
Stream 7Q10 = 10 MGD
Stream 30Q10 = 13.8 MGD
Stream 1Q10 = 8.5 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

→ high flow

Mixing Zone Predictions @ 7Q10

Depth = .8457 ft
Length = 915.4 ft
Velocity = .9379 ft/sec
Residence Time = .0113 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.0288 ft
Length = 768.77 ft
Velocity = 1.0569 ft/sec
Residence Time = .0084 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .7669 ft
Length = 997.87 ft
Velocity = .883 ft/sec
Residence Time = .3139 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Attachment 9

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Boston Water & Sewer STP - 0.45 MGDN New Facility Permit No.: VA0088749
 Receiving Stream: Hazel River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information														
Parameter	Background Conc.	Acute	Water Quality Criteria	Acute	Chronic	Wasteload Allocations	Acute	Chronic	Antidegradation Baseline	Acute	Chronic	HH (PWS)	HH	Antidegradation Allocations	Acute	Chronic	HH (PWS)	HH	Most Limiting Allocations	
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	6.9E+03	--	--	na	9.9E+01	--	--	na	6.9E+02	--	--	
Acrolein	0	--	--	na	9.3E+00	--	--	na	6.5E+01	--	--	na	9.3E+01	--	--	na	6.5E+00	--	--	
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	6.9E+01	--	--	na	2.5E+01	--	--	na	6.9E+00	--	--	
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	4.5E+00	--	na	1.4E-02	7.5E-01	--	na	5.0E-05	1.6E+00	--	na	1.4E-03	1.6E+00	--	
Ammonia-N (mg/l) (Yearly)	0	1.01E+01	1.58E+00	na	--	1.5E+01	7.2E+00	na	--	2.53E+00	3.95E-01	na	--	5.5E+00	1.8E+00	na	--	5.5E+00	1.8E+00	na
Ammonia-N (mg/l) (High Flow)	0	1.01E+01	2.59E+00	na	--	2.0E+02	8.2E+01	na	--	2.53E+00	6.48E-01	na	--	5.0E+01	2.1E+01	na	--	5.0E+01	2.1E+01	na
Anthracene	0	--	--	na	4.0E+04	--	--	na	2.8E+05	--	--	na	4.0E+03	--	--	na	2.8E+04	--	--	
Antimony	0	--	--	na	6.4E+02	--	--	na	4.5E+03	--	--	na	6.4E+01	--	--	na	4.5E+02	--	--	
Arsenic	0	3.4E+02	1.5E+02	na	--	5.1E+02	4.1E+02	na	--	8.5E+01	3.8E+01	na	--	1.9E+02	1.0E+02	na	--	1.9E+02	1.0E+02	na
Barium	0	--	--	na	--	--	--	na	--	--	na	--	--	--	na	--	--	--	--	
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	1.4E+04	--	--	na	5.1E+01	--	--	na	1.4E+03	--	--	
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	5.5E-02	--	--	na	2.0E-04	--	--	na	5.5E-03	--	--	
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	5.0E+00	--	--	na	1.8E-02	--	--	na	5.0E-01	--	--	
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	5.0E+00	--	--	na	1.8E-02	--	--	na	5.0E-01	--	--	
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	5.0E+00	--	--	na	1.8E-02	--	--	na	5.0E-01	--	--	
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	5.0E+00	--	--	na	1.8E-02	--	--	na	5.0E-01	--	--	
Biomonitor ^c	0	--	--	na	5.3E+00	--	--	na	1.5E+02	--	--	na	5.3E-01	--	--	na	1.5E+01	--	--	
Bis-2-Chloroethyl Ether ^c	0	--	--	na	6.5E+04	--	--	na	4.6E+05	--	--	na	6.5E+03	--	--	na	4.6E+04	--	--	
Bis-2-Chloroisopropyl Ether	0	--	--	na	2.2E+01	--	--	na	6.1E+02	--	--	na	2.2E+00	--	--	na	6.1E+01	--	--	
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	1.4E+03	--	--	na	3.9E+04	--	--	na	1.4E+02	--	--	na	3.9E+03	--	--	
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.3E+04	--	--	na	1.9E+02	--	--	na	1.3E+03	--	--	
Cadmium	0	8.2E-01	3.8E-01	na	--	1.2E+00	1.0E+00	na	--	2.1E-01	9.5E-02	na	--	4.5E-01	2.6E-01	na	--	4.5E-01	2.6E-01	na
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	4.4E+02	--	--	na	1.6E+00	--	--	na	4.4E+01	--	--	
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	3.6E+00	1.2E-02	na	2.2E-01	6.0E-01	1.1E-03	na	8.1E-04	1.3E+00	2.9E-03	na	2.2E-02	1.3E+00	2.9E-03	
Chloride	0	8.6E+05	2.3E+05	na	--	1.3E+06	6.3E+05	na	--	2.2E+05	5.8E+04	na	--	4.7E+05	1.6E+05	na	--	4.7E+05	1.6E+05	na
TRC	0	1.9E+01	1.1E+01	na	--	2.9E+01	3.0E+01	na	--	4.8E+00	2.8E+00	na	--	1.0E+01	7.5E+00	na	--	1.0E+01	7.5E+00	na
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.1E+04	--	--	na	1.6E+02	--	--	na	1.1E+03	--	--	

Mean Hardness (as CaCO ₃) = 25 mg/L	90% Temperature (Annual) = 23.4 deg C	90% Temperature (Wet season) = 15.7 deg C	90% Maximum pH = 7.9 SU	10% Maximum pH = 7.9 SU	Tier Designation (1 or 2) = 2	Public Water Supply (PWS) Y/N? = n	Trout Present Y/N? = n	Early Life Stages Present Y/N? = y	Effluent Hardness (as CaCO ₃) = 42.99 %	90% Temp (Annual) = 100 %	90% Temp (Wet season) = 100 %	90% Maximum pH = 100 %	10% Maximum pH = 100 %	Discharge Flow = 0.45 MGD
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Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Chlorobromomethane ^c	0	--	--	na	1.3E+02	--	--	na	3.6E+03	--	--	na	1.3E+01	--	--	na	3.6E+02	--	--	na	3.6E+02	
Chloroform	0	--	--	na	1.1E+04	--	--	na	7.7E+04	--	--	na	1.1E+03	--	--	na	7.7E+03	--	--	na	7.7E+03	
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.1E+04	--	--	na	1.6E+02	--	--	na	1.1E+03	--	--	na	1.1E+03	
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.1E+03	--	--	na	1.5E+01	--	--	na	1.1E+02	--	--	na	1.1E+02	
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.3E-01	1.1E-01	na	--	2.1E-02	1.0E-02	na	--	4.5E-02	2.8E-02	na	--	4.5E-02	2.8E-02	na	--	
Chromium III	0	1.8E+02	2.4E+01	na	--	2.8E+02	6.5E+01	na	--	4.6E+01	6.0E+00	na	--	1.0E+02	1.6E+01	na	--	1.0E+02	1.6E+01	na	--	
Chromium VI	0	1.6E+01	1.1E+01	na	--	2.4E+01	3.0E+01	na	--	4.0E+00	2.8E+00	na	--	8.7E+00	7.5E+00	na	--	8.7E+00	7.5E+00	na	--	
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	1.0E+01	--	--	--	--	--	7.0E+01	--	--	na	--	
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	5.0E-01	--	--	na	1.8E-03	--	--	na	5.0E-02	--	--	na	5.0E-02	
Copper	0	3.6E+00	2.7E+00	na	--	5.5E+00	7.5E+00	na	--	9.1E-01	6.8E-01	na	--	2.0E+00	1.9E+00	na	--	2.0E+00	1.9E+00	na	--	
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	3.3E+01	1.4E+01	na	1.1E+05	5.5E+00	1.3E+00	na	1.6E+03	1.2E+01	3.6E+00	na	1.2E+01	3.6E+00	na	1.1E+04		
DDD ^c	0	--	--	na	3.1E-03	--	--	na	8.6E-02	--	--	na	3.1E-04	--	--	na	8.6E-03	--	--	na	8.6E-03	
DDE ^c	0	--	--	na	2.2E-03	--	--	na	6.1E-02	--	--	na	2.2E-04	--	--	na	6.1E-03	--	--	na	6.1E-03	
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	1.7E+00	2.7E-03	na	6.1E-02	2.8E-01	2.5E-04	na	2.2E-04	6.0E-01	6.8E-04	na	6.0E-01	6.8E-04	na	6.1E-03		
Demeton	0	--	1.0E-01	na	--	--	2.7E-01	na	--	--	2.5E-02	na	--	--	6.8E-02	na	--	--	6.8E-02	na	--	
Diazinon	0	1.7E-01	1.7E-01	na	--	2.6E-01	4.6E-01	na	--	4.3E-02	4.3E-02	na	--	9.3E-02	1.2E-01	na	--	9.3E-02	1.2E-01	na	--	
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	5.0E+00	--	--	na	1.8E-02	--	--	na	5.0E-01	--	--	na	5.0E-01	
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	9.1E+03	--	--	na	1.3E+02	--	--	na	9.1E+02	--	--	na	9.1E+02	
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	6.7E+03	--	--	na	9.6E+01	--	--	na	6.7E+02	--	--	na	6.7E+02	
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.3E+03	--	--	na	1.9E+01	--	--	na	1.3E+02	--	--	na	1.3E+02	
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	7.7E+00	--	--	na	2.8E-02	--	--	na	7.7E-01	--	--	na	7.7E-01	
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	4.7E+03	--	--	na	1.7E+01	--	--	na	4.7E+02	--	--	na	4.7E+02	
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	1.0E+04	--	--	na	3.7E+01	--	--	na	1.0E+03	--	--	na	1.0E+03	
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	5.0E+04	--	--	na	7.1E+02	--	--	na	5.0E+03	--	--	na	5.0E+03	
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	7.0E+04	--	--	na	1.0E+03	--	--	na	7.0E+03	--	--	na	7.0E+03	
2,4-Dichlorophend	0	--	--	na	2.9E+02	--	--	na	2.0E+03	--	--	na	2.9E+01	--	--	na	2.0E+02	--	--	na	2.0E+02	
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	na	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--		
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	4.2E+03	--	--	na	1.5E+01	--	--	na	4.2E+02	--	--	na	4.2E+02	
1,3-Dichloropropane ^c	0	--	--	na	2.1E+02	--	--	na	5.8E+03	--	--	na	2.1E+01	--	--	na	5.8E+02	--	--	na	5.8E+02	
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	3.6E-01	1.5E-01	na	1.5E-02	6.0E-02	1.4E-02	na	5.4E-05	1.3E-01	3.8E-02	na	1.5E-03	1.3E-01	3.8E-02	na	1.5E-03	
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	3.1E+05	--	--	na	4.4E+03	--	--	na	3.1E+04	--	--	na	3.1E+04	
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	6.0E+03	--	--	na	8.5E+01	--	--	na	6.0E+02	--	--	na	6.0E+02	
Dinitrophenyl Phthalate	0	--	--	na	1.1E+06	--	--	na	7.7E+06	--	--	na	1.1E+05	--	--	na	7.7E+05	--	--	na	7.7E+05	
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	3.2E+04	--	--	na	4.5E+02	--	--	na	3.2E+03	--	--	na	3.2E+03	
2,4-Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	3.7E+04	--	--	na	5.3E+02	--	--	na	3.7E+03	--	--	na	3.7E+03	
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.0E+03	--	--	na	2.8E+01	--	--	na	2.0E+02	--	--	na	2.0E+02	
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	9.4E+02	--	--	na	3.4E+00	--	--	na	9.4E+01	--	--	na	9.4E+01	
Dioxin 2,3,7,8-	0	--	--	na	5.1E-08	--	--	na	3.6E-07	--	--	na	5.1E-09	--	--	na	3.6E-08	--	--	na	3.6E-08	
tetrachlorodibenzo-p-dioxin	0	--	--	na	2.0E+00	--	--	na	5.5E+01	--	--	na	2.0E-01	--	--	na	5.5E+00	--	--	na	5.5E+00	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	3.3E-01	1.5E-01	na	6.2E+02	5.5E-02	1.4E-02	na	8.9E+00	1.2E+01	3.8E-02	na	6.2E+01	1.2E+01	3.8E-02	na	6.2E+01	
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	3.3E-01	1.5E-01	na	6.2E+02	5.5E-02	1.4E-02	na	8.9E+00	1.2E+01	3.8E-02	na	6.2E+01	1.2E+01	3.8E-02	na	6.2E+01	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	3.3E-01	1.5E-01	na	6.2E+02	5.5E-02	1.4E-02	na	8.9E+00	1.2E+01	3.8E-02	na	6.2E+01	1.2E+01	3.8E-02	na	6.2E+01	
Endosulfan Sulfate	0	--	8.6E-02	3.6E-02	na	6.0E-02	1.3E-01	9.8E-02	na	4.2E-01	2.2E-02	9.0E-03	na	6.0E-03	4.7E-02	2.5E-02	na	4.2E-02	2.5E-02	na	4.2E-02	
Endrin	0	--	3.0E-01	--	na	3.0E-01	--	--	na	2.1E+00	--	--	na	3.0E-02	--	--	na	2.1E+01	--	--	na	2.1E+01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.5E+04	--	--	na	2.1E+02	--	--	na	1.5E+03	--	--	na	1.5E+03	
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	9.8E+02	--	--	na	1.4E+01	--	--	na	9.8E+01	--	--	na	9.8E+01	
Fluorene	0	--	--	na	5.3E+03	--	--	na	3.7E+04	--	--	na	5.3E+02	--	--	na	3.7E+03	--	--	na	3.7E+03	
Foaming Agents	0	--	--	na	--	--	--	na	--	--	na	--	--	--	--	na	--	--	--	na	--	
Guthion	0	--	1.0E-02	na	--	2.7E-02	na	--	2.5E-03	na	--	6.8E-03	na	--	6.8E-03	na	--	6.8E-03	na	--	6.8E-03	
Heptachlor	C	0	5.2E-01	3.8E-03	na	7.9E-04	7.8E-01	1.0E-02	na	2.2E-02	1.3E-01	9.5E-04	na	7.9E-05	2.8E-01	2.6E-03	na	2.2E-03	2.8E-01	2.6E-03	na	2.2E-03
Heptachlor Epoxide	C	0	5.2E-01	3.8E-03	na	3.9E-04	7.8E-01	1.0E-02	na	1.1E-02	1.9E-01	9.5E-04	na	3.9E-05	2.8E-01	2.6E-03	na	1.1E-03	2.8E-01	2.6E-03	na	1.1E-03
Heptachlorobenzene	C	0	--	na	2.9E-03	--	na	8.0E-02	--	na	2.9E-04	--	na	8.0E-03	--	na	8.0E-03	--	na	8.0E-03	--	
Hexachlorobutadiene	C	0	--	na	1.8E+02	--	na	5.0E+03	--	na	1.8E+01	--	na	5.0E+02	--	na	5.0E+02	--	na	5.0E+02	--	
Hexachlorocyclohexane	C	0	--	na	4.9E-02	--	na	1.4E+00	--	na	4.9E-03	--	na	1.4E-01	--	na	1.4E-01	--	na	1.4E-01	--	
Hexachlorocyclohexane	Beta-BHC	0	--	na	1.7E-01	--	na	4.7E+00	--	na	1.7E-02	--	na	4.7E-01	--	na	4.7E-01	--	na	4.7E-01	--	
Hexachlorocyclohexane	Gamma-BHC (Lindane)	0	9.5E-01	na	1.8E+00	1.4E+00	--	na	5.0E+01	2.4E-01	--	na	1.8E-01	5.2E-01	--	na	5.0E+00	5.2E-01	--	na	5.0E+00	
Hexachlorocyclopentadiene	0	--	na	1.1E+03	--	na	7.7E+03	--	na	1.1E+02	--	na	7.7E+02	--	na	7.7E+02	--	na	7.7E+02	--		
Hexachloroethane	C	0	--	na	3.3E+01	--	na	9.1E+02	--	na	3.3E+00	--	na	9.1E+01	--	na	9.1E+01	--	na	9.1E+01	--	
Hydrogen Sulfide	0	--	2.0E+00	na	--	5.5E+00	na	--	5.0E-01	na	--	1.4E+00	na	--	1.4E+00	na	--	1.4E+00	na	--	1.4E+00	
Indeno (1,2,3- <i>cd</i>) pyrene	C	0	--	na	1.8E-01	--	na	5.0E+00	--	na	1.8E-02	--	na	5.0E-01	--	na	5.0E-01	--	na	5.0E-01	--	
Iron	0	--	na	--	na	9.6E+03	--	na	2.7E+05	--	na	9.6E+02	--	na	2.7E+04	--	na	2.7E+04	--	na	2.7E+04	
Iosphorone	C	0	--	na	0.0E+00	na	--	na	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	
Kepone	0	--	0.2E+01	2.3E+00	na	--	3.1E+01	6.3E+00	na	--	5.1E+00	5.8E-01	na	--	1.1E+01	1.6E+00	na	--	1.1E+01	1.6E+00	na	--
Lead	0	--	1.0E-01	na	--	2.7E-01	na	--	2.5E-02	na	--	6.8E-02	na	--	6.8E-02	na	--	6.8E-02	na	--	6.8E-02	
Malathion	0	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	
Manganese	0	--	1.4E+00	7.7E-01	--	2.1E+00	2.1E+00	--	3.5E-01	1.9E-01	--	7.6E-01	5.3E-01	--	7.6E-01	5.3E-01	--	7.6E-01	5.3E-01	--	7.6E-01	
Mercury	0	--	na	--	na	1.5E+03	--	na	1.1E+04	--	na	1.5E+02	--	na	1.1E+03	--	na	1.1E+03	--	na	1.1E+03	
Methyl Bromide	0	--	na	--	na	5.9E+03	--	na	1.6E+05	--	na	5.9E+02	--	na	1.6E+04	--	na	1.6E+04	--	na	1.6E+04	
Methylene Chloride	C	0	--	3.0E-02	na	--	8.2E-02	na	--	7.5E-03	na	--	2.1E-02	na	--	2.1E-02	na	--	2.1E-02	na	--	
Methoxychlor	0	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	na	--	0.0E+00	
Mirex	0	5.6E+01	6.3E+00	na	4.6E+03	8.5E+01	1.7E+01	na	3.2E+04	1.4E+01	1.6E+00	na	4.6E+02	3.1E+01	4.3E+00	na	3.2E+03	3.1E+01	4.3E+00	na	3.2E+03	
Nickel	0	--	na	--	na	6.9E+02	--	na	4.8E+03	--	na	6.9E+01	--	na	4.8E+02	--	na	4.8E+02	--	na	4.8E+02	
Nitrate (as N)	0	--	na	--	na	3.0E+01	--	na	8.3E+02	--	na	3.0E+00	--	na	8.3E+01	--	na	8.3E+01	--	na	8.3E+01	
Nitrobenzene	0	--	na	--	na	6.0E+01	--	na	1.7E+03	--	na	6.0E+00	--	na	1.7E+02	--	na	1.7E+02	--	na	1.7E+02	
N-Nitrosodimethylamine	C	0	--	na	5.1E+00	--	na	1.4E+02	--	na	5.1E-01	--	na	1.4E+01	--	na	1.4E+01	--	na	1.4E+01		
N-Nitrosodiphenylamine	C	0	--	na	2.8E+01	6.6E+00	--	na	4.2E+01	1.8E+01	na	--	7.0E+00	1.7E+00	--	1.5E+01	4.5E+00	--	1.5E+01	4.5E+00	--	
N-Nitrosodi-n-propylamine	C	0	--	na	6.5E-02	1.4E-02	na	9.8E-02	3.6E-02	na	--	1.6E-02	3.3E-03	na	--	3.5E-02	8.9E-03	na	--	3.5E-02	8.9E-03	
Phenol	0	--	na	--	na	4.0E+03	--	na	2.8E+04	--	na	4.0E+02	--	na	4.0E+02	--	na	4.0E+02	--	na	4.0E+02	
Pyrene	0	--	na	--	na	4.0E+03	--	na	2.8E+04	--	na	4.0E+02	--	na	2.8E+03	--	na	2.8E+03	--	na	2.8E+03	
Radiation	0	--	na	--	na	3.0E+03	5.9E-03	na	1.2E-02	1.6E-02	na	8.3E+02	1.9E-03	na	4.2E+03	4.0E-03	na	4.2E+03	4.0E-03	na	4.2E+03	
Pentachlorophenol	C	0	7.7E-03	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	
Radium 226 + 228 (pCi/L)	0	--	na	--	na	4.0E+00	--	na	2.8E+01	--	na	4.0E-01	--	na	2.8E+00	--	na	2.8E+00	--	na	2.8E+00	
Uranium (ug/l)	0	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	--	na	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	3.0E+01	1.4E+01	na	2.9E+04	5.0E+00	1.3E+00	na	4.2E+02	1.1E+01	3.4E+00	na	2.9E+03	1.1E+01	3.4E+00	na	2.9E+03
Silver	0	3.2E-01	-	na	--	4.8E-01	-	na	-	7.9E-02	-	na	--	1.7E-01	--	na	--	1.7E-01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	1.1E+03	--	--	na	4.0E+00	--	--	na	1.1E+02	--	--	na	1.1E+02
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	9.1E+02	--	--	na	3.3E+00	--	--	na	9.1E+01	--	--	na	9.1E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	3.3E+00	--	--	na	4.7E-02	--	--	na	3.3E-01	--	--	na	3.3E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	4.2E+04	--	--	na	6.0E+02	--	--	na	4.2E+03	--	--	na	4.2E+03
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	1.1E+00	5.5E-04	na	7.7E-02	1.8E-01	5.0E-05	na	2.8E-04	4.0E-01	1.4E-04	na	7.7E-03	4.0E-01	1.4E-04	na	7.7E-03
Tritylolin	0	4.6E-01	7.2E-02	na	--	6.9E-01	2.0E-01	na	--	1.2E-01	1.8E-02	na	--	2.5E-01	4.9E-02	na	--	2.5E-01	4.9E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	4.9E+02	--	--	na	7.0E+00	--	--	na	4.9E+01	--	--	na	4.9E+01
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	4.4E+03	--	--	na	1.6E+01	--	--	na	4.4E+02	--	--	na	4.4E+02
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	8.3E+03	--	--	na	3.0E+01	--	--	na	8.3E+02	--	--	na	8.3E+02
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	6.6E+02	--	--	na	2.4E+00	--	--	na	6.6E+01	--	--	na	6.6E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	6.6E+02	--	--	na	2.4E+00	--	--	na	6.6E+01	--	--	na	6.6E+01
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	5.5E+01	1.0E+02	na	1.8E+05	9.1E+00	9.1E+00	na	2.6E+03	2.0E+01	2.5E+01	na	1.8E+04	2.0E+01	2.5E+01	na	1.8E+04

Notes:

1. All concentrations expressed as micrograms/litter (ug/l), unless noted otherwise

2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipalities

3. Metals measured as Dissolved, unless specified otherwise

4. "C" indicates a carcinogenic parameter

5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.

Antidegradation WLAs are based upon a complete mix.

6. Antideg. Baseline = $(0.25 \times WQC - \text{background conc.}) + (\text{background conc.} \times \text{acute and chronic conc.})$ for acute and chronic

= $(0.1 \times WQC - \text{background conc.}) + (\text{background conc.})$ for human health

7. WLAs established at the following stream flows: 1Q10 for Acute, 3Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 3QQ5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	4.5E+02
Arsenic	6.2E+01
Barium	na
Cadmium	1.6E-01
Chromium III	9.8E+00
Chromium VI	3.5E+00
Copper	7.9E-01
Iron	na
Lead	9.5E-01
Manganese	na
Mercury	3.0E-01
Nickel	2.6E+00
Selenium	2.1E+00
Silver	6.9E-02
Zinc	7.9E+00

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .45 MGD
Stream 7Q10 = .78 MGD
Stream 30Q10 = 1.6 MGD
Stream 1Q10 = .53 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

> low flow

Mixing Zone Predictions @ 7Q10

Depth = .2315 ft
Length = 2800.74 ft
Velocity = .4111 ft/sec
Residence Time = .0788 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .3156 ft
Length = 2151.9 ft
Velocity = .5027 ft/sec
Residence Time = .0495 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2018 ft
Length = 3147.35 ft
Velocity = .3758 ft/sec
Residence Time = 2.3261 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 42.99% of the 1Q10 is used.

Mixing Zone Predictions for Boston W&S New Facility

Effluent Flow = .45 MGD
Stream 7Q10 = 10 MGD
Stream 30Q10 = 13.8 MGD
Stream 1Q10 = 8.5 MGD
Stream slope = .00138 ft/ft
Stream width = 20 ft
Bottom scale = 1
Channel scale = 1

→ high flow

Mixing Zone Predictions @ 7Q10

Depth = .856 ft
Length = 905.52 ft
Velocity = .9448 ft/sec
Residence Time = .0111 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.038 ft
Length = 762.68 ft
Velocity = 1.0626 ft/sec
Residence Time = .0083 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .7777 ft
Length = 985.67 ft
Velocity = .8907 ft/sec
Residence Time = .3074 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

8/11/2010 6:52:33 AM

Facility = Boston W&S New 0.075 MGD facility
Chemical = Ammonia as N (Jun-Nov)
Chronic averaging period = 30
WLAA = 20
WLAC = 8.8
Q.L. = .2
samples/mo. = 4
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 17.7554968220635
Average Weekly limit = 17.7554968220635
Average Monthly LImit = 12.1398898816358

The data are:

8/11/2010 6:52:56 AM

Facility = Boston W&S New 0.075 MGD facility
Chemical = Ammonia as N (Dec-May)
Chronic averaging period = 30
WLAa = 290
WLAc = 120
Q.L. = .2
samples/mo. = 4
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8/10/2010 8:43:14 AM

Facility = Boston W&S New 0.15 MGD facility
Chemical = Ammonia as N (Jun-Nov)
Chronic averaging period = 30
WL_{Aa} = 11
WL_{Ac} = 4.6
Q.L. = .2
samples/mo. = 13
samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 9.28128242971503
Average Weekly limit = 6.78873556040874
Average Monthly LImit = 5.0079710782924

The data are:

8/10/2010 8:44:22 AM

Facility = Boston W&S New 0.15 MGD facility

Chemical = Ammonia as N (Dec-May)

Chronic averaging period = 30

WL_{Aa} = 150

WL_{Ac} = 60

Q.L. = .2

samples/mo. = 13

samples/wk. = 3

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average= 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8/10/2010 8:46:48 AM

Facility = Boston W&S New 0.25 MGD facility
Chemical = Ammonia as N (Jun-Nov)
Chronic averaging period = 30
WL_{Aa} = 7.9
WL_{Ac} = 2.9
Q.L. = .2
samples/mo. = 13
samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 5.8512432709073
Average Weekly limit = 4.2798550272142
Average Monthly LImit = 3.1571991580539

The data are:

8/10/2010 8:45:25 AM

Facility = Boston W&S New 0.25 MGD facility
Chemical = Ammonia as N (Dec-May)
Chronic averaging period = 30
WLAA = 89
WLAC = 36
Q.L. = .2
samples/mo. = 13
samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8/10/2010 8:47:45 AM

Facility = Boston W&S New 0.45 MGD facility
Chemical = Ammonia as N (Jun-Nov)
Chronic averaging period = 30
WLAa = 5.5
WLAc = 1.8
Q.L. = .2
samples/mo. = 13
samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 3.63180616814936
Average Weekly limit = 2.65646174102951
Average Monthly LImit = 1.95964085672311

The data are:

8/10/2010 8:48:54 AM

Facility = Boston W&S New 0.45 MGD facility
Chemical = Ammonia as N (Dec-May)
Chronic averaging period = 30
WLAa = 50
WLAc = 21
Q.L. = .2
samples/mo. = 13
samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

8/11/2010 6:58:37 AM

Facility = Boston W&S New 0.075 MGD facility
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WL_{Aa} = 0.038
WL_{Ac} = 0.031
Q.L. = .1
samples/mo. = 30
samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.038
Average Weekly limit = 2.26671932642844E-02
Average Monthly LImit = 1.88336042269718E-02

The data are:

0.2

8/11/2010 6:59:18 AM

Facility = Boston W&S New .15 MGD facility
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAA = 0.022
WLAC = 0.017
Q.L. = .1
samples/mo. = 30
samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.022
Average Weekly limit = 1.3123118898489E-02
Average Monthly Limit = 1.09036656050889E-02

The data are:

0.2

8/11/2010 6:59:50 AM

Facility = Boston W&S New .25 MGD facility
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAA = 0.015
WLAC = 0.011
Q.L. = .1
samples/mo. = 30
samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.015
Average Weekly limit = 8.94757628853332E-03
Average Monthly Limit = 7.43431745801518E-03

The data are:

0.2

8/11/2010 7:00:34 AM

Facility = Boston W&S New .45 MGD facility
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAA = 0.01
WLAC = 0.0075
Q.L. = .1
samples/mo. = 30
samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = .2
Variance = .0144
C.V. = 0.6
97th percentile daily values = .486683
97th percentile 4 day average = .332758
97th percentile 30 day average= .241210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 0.01
Average Weekly limit = 5.96505085902221E-03
Average Monthly Limit = 4.95621163867679E-03

The data are:

0.2

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

File Information

File Name: U:\Water Permits\Regional\Boston W_S_5_3_6_low_75000.mod
Date Modified: November 30, 2005

Water Quality Standards Information

Stream Name: HAZEL RIVER
River Basin: Rappahannock River Basin
Section: 4
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: 01663500
Gauge Drainage Area: 287 Sq.Mi.
Gauge 7Q10 Flow: 3.748 MGD
Headwater Drainage Area: 59.159 Sq.Mi.
Headwater 7Q10 Flow: 0.7725712 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 1.305923E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.391394 mg/l.

Model Segmentation

Number of Segments: 3
Model Start Elevation: 420 ft above MSL
Model End Elevation: 340 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	BOSTON WATER & SEWER STP NEW FACILITY
VPDES Permit No.:	VA0088749

Discharger Flow Information

Flow:	0.075 MGD
cBOD5:	5 mg/l
TKN:	3 mg/l
D.O.:	6 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.5 miles
Upstream Drainage Area:	59.159 Sq.Mi.
Downstream Drainage Area:	84 Sq.Mi.
Upstream Elevation:	420 Ft.
Downstream Elevation:	400 Ft.

Hydraulic Information

Segment Width:	1.8 Ft.
Segment Depth:	1.027 Ft.
Segment Velocity:	0.709 Ft./Sec.
Segment Flow:	0.848 MGD
Incremental Flow:	0.325 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	UT HAZEL RIVER

Tributary Flow Information

Flow:	0.06 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.397 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.8 miles
Upstream Drainage Area:	84 Sq.Mi.
Downstream Drainage Area:	89 Sq.Mi.
Upstream Elevation:	400 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	1.8 Ft.
Segment Depth:	1.088 Ft.
Segment Velocity:	0.736 Ft./Sec.
Segment Flow:	0.908 MGD
Incremental Flow:	0.065 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	UT HAZEL RIVER

Tributary Flow Information

Flow:	0.103 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.407 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	3.7 miles
Upstream Drainage Area:	89 Sq.Mi.
Downstream Drainage Area:	110 Sq.Mi.
Upstream Elevation:	360 Ft.
Downstream Elevation:	340 Ft.

Hydraulic Information

Segment Width:	4.001 Ft.
Segment Depth:	0.542 Ft.
Segment Velocity:	0.539 Ft./Sec.
Segment Flow:	1.011 MGD
Incremental Flow:	0.274 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

modout
"Model Run For U:\Water Permits\Regional\Boston W_S_5_3_6_low_75000.mod on
11/30/2005 9:25:53 AM"

"Model is for HAZEL RIVER."

"Model starts at the BOSTON WATER & SEWER STP NEW FACILITY discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.7726, 2, 0, 7.391, 25

"Discharge/Tributary Input Data for Segment 1"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.075, 5, 3, ,6, 25

"Hydraulic Information for Segment 1"

"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.5, 1.8, 1.027, .709

"Initial Mix values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.8476, 7.268, 5.664, 0, 8.216, 25

"Rate Constants for Segment 1. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .629, 4.8, 5.404, .15, .22, 0, 0

"Output for Segment 1"

"Segment starts at BOSTON WATER & SEWER STP NEW FACILITY"

"Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.268, 5.664, 0
.1, .1, 7.281, 5.633, 0
.2, .2, 7.294, 5.603, 0
.3, .3, 7.306, 5.573, 0
.4, .4, 7.318, 5.543, 0
.5, .5, 7.33, 5.513, 0
.6, .6, 7.341, 5.483, 0
.7, .7, 7.352, 5.453, 0
.8, .8, 7.362, 5.424, 0
.9, .9, 7.372, 5.395, 0
1, 1, 7.382, 5.366, 0
1.1, 1.1, 7.392, 5.337, 0
1.2, 1.2, 7.394, 5.308, 0
1.3, 1.3, 7.394, 5.279, 0
1.4, 1.4, 7.394, 5.25, 0
1.5, 1.5, 7.394, 5.222, 0
1.6, 1.6, 7.394, 5.194, 0
1.7, 1.7, 7.394, 5.166, 0
1.8, 1.8, 7.394, 5.138, 0
1.9, 1.9, 7.394, 5.11, 0
2, 2, 7.394, 5.082, 0
2.1, 2.1, 7.394, 5.055, 0
2.2, 2.2, 7.394, 5.028, 0
2.3, 2.3, 7.394, 5.001, 0
2.4, 2.4, 7.394, 5, 0
2.5, 2.5, 7.394, 5, 0

modout

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.06, 2, 0, ,7.397, 25

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.325, 2, 0, ,7.402, 25

"Hydraulic Information for Segment 2"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
4.8, 1.8, 1.088, .736

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.2326, 7.396, 5, 0, 8.224, 25

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .629, 5, 5.629, .15, .22, 0, 0

"Output for Segment 2"
"Segment starts at UT HAZEL RIVER"

"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
2.5, 0, 7.396, 5, 0
2.6, .1, 7.402, 5, 0
2.7, .2, 7.402, 5, 0
2.8, .3, 7.402, 5, 0
2.9, .4, 7.402, 5, 0
3, .5, 7.402, 5, 0
3.1, .6, 7.402, 5, 0
3.2, .7, 7.402, 5, 0
3.3, .8, 7.402, 5, 0
3.4, .9, 7.402, 5, 0
3.5, 1, 7.402, 5, 0
3.6, 1.1, 7.402, 5, 0
3.7, 1.2, 7.402, 5, 0
3.8, 1.3, 7.402, 5, 0
3.9, 1.4, 7.402, 5, 0
4, 1.5, 7.402, 5, 0
4.1, 1.6, 7.402, 5, 0
4.2, 1.7, 7.402, 5, 0
4.3, 1.8, 7.402, 5, 0
4.4, 1.9, 7.402, 5, 0
4.5, 2, 7.402, 5, 0
4.6, 2.1, 7.402, 5, 0
4.7, 2.2, 7.402, 5, 0
4.8, 2.3, 7.402, 5, 0
4.9, 2.4, 7.402, 5, 0
5, 2.5, 7.402, 5, 0
5.1, 2.6, 7.402, 5, 0
5.2, 2.7, 7.402, 5, 0
5.3, 2.8, 7.402, 5, 0
5.4, 2.9, 7.402, 5, 0
5.5, 3, 7.402, 5, 0
5.6, 3.1, 7.402, 5, 0

				modout
5.7,	3.2,	7.402,	5,	0
5.8,	3.3,	7.402,	5,	0
5.9,	3.4,	7.402,	5,	0
6,	3.5,	7.402,	5,	0
6.1,	3.6,	7.402,	5,	0
6.2,	3.7,	7.402,	5,	0
6.3,	3.8,	7.402,	5,	0
6.4,	3.9,	7.402,	5,	0
6.5,	4,	7.402,	5,	0
6.6,	4.1,	7.402,	5,	0
6.7,	4.2,	7.402,	5,	0
6.8,	4.3,	7.402,	5,	0
6.9,	4.4,	7.402,	5,	0
7,	4.5,	7.402,	5,	0
7.1,	4.6,	7.402,	5,	0
7.2,	4.7,	7.402,	5,	0
7.3,	4.8,	7.402,	5,	0

"Discharge/Tributary Input Data for Segment 3"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .103, 2, 0, ,7.407, 25

"Incremental Flow Input Data for Segment 3"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .065, 2, 0, ,7.41, 25

"Hydraulic Information for Segment 3"
 "Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 3.7, 4.001, .542, .539

"Initial Mix Values for Segment 3"
 "Flow", "DO", "cBOD", "nBOD", "posat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.4006, 7.403, 5, 0, 8.233, 25

"Rate Constants for Segment 3. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .629, 3.243, 3.652, .15, .22, 0, 0

"Output for Segment 3"
 "Segment starts at UT HAZEL RIVER"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 7.3, 0, 7.403, 5, 0
 7.4, .1, 7.41, 5, 0
 7.5, .2, 7.41, 5, 0
 7.6, .3, 7.41, 5, 0
 7.7, .4, 7.41, 5, 0
 7.8, .5, 7.41, 5, 0
 7.9, .6, 7.41, 5, 0
 8, .7, 7.41, 5, 0
 8.1, .8, 7.41, 5, 0
 8.2, .9, 7.41, 5, 0
 8.3, 1, 7.41, 5, 0
 8.4, 1.1, 7.41, 5, 0
 8.5, 1.2, 7.41, 5, 0

				modout
8.6,	1.3,	7.41,	5,	0
8.7,	1.4,	7.41,	5,	0
8.8,	1.5,	7.41,	5,	0
8.9,	1.6,	7.41,	5,	0
9,	1.7,	7.41,	5,	0
9.1,	1.8,	7.41,	5,	0
9.2,	1.9,	7.41,	5,	0
9.3,	2,	7.41,	5,	0
9.4,	2.1,	7.41,	5,	0
9.5,	2.2,	7.41,	5,	0
9.6,	2.3,	7.41,	5,	0
9.7,	2.4,	7.41,	5,	0
9.8,	2.5,	7.41,	5,	0
9.9,	2.6,	7.41,	5,	0
10,	2.7,	7.41,	5,	0
10.1,	2.8,	7.41,	5,	0
10.2,	2.9,	7.41,	5,	0
10.3,	3,	7.41,	5,	0
10.4,	3.1,	7.41,	5,	0
10.5,	3.2,	7.41,	5,	0
10.6,	3.3,	7.41,	5,	0
10.7,	3.4,	7.41,	5,	0
10.8,	3.5,	7.41,	5,	0
10.9,	3.6,	7.41,	5,	0
11,	3.7,	7.41,	5,	0

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to HAZEL RIVER.**

File Information

File Name: U:\Water Permits\VPDES Program\Facility Archive\Boston Water & Sewerage
Date Modified: December 05, 2005
Page Number: 150,000

Water Quality Standards Information

Stream Name: HAZEL RIVER
River Basin: Rappahannock River Basin
Section: 4
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: 01663500
Gauge Drainage Area: 287 Sq.Mi.
Gauge 7Q10 Flow: 3.748 MGD
Headwater Drainage Area: 59.159 Sq.Mi.
Headwater 7Q10 Flow: 0.7725712 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 1.305923E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.391394 mg/l

Model Segmentation

Number of Segments: 3
Model Start Elevation: 420 ft above MSL
Model End Elevation: 340 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	BOSTON WATER & SEWER STP NEW FACILITY
VPDES Permit No.:	VA0088749

Discharger Flow Information

Flow:	0.15 MGD
cBOD5:	5 mg/l
TKN:	3 mg/l
D.O.:	6.8 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.5 miles
Upstream Drainage Area:	59.159 Sq.Mi.
Downstream Drainage Area:	84 Sq.Mi.
Upstream Elevation:	420 Ft.
Downstream Elevation:	400 Ft.

Hydraulic Information

Segment Width:	3.6 Ft.
Segment Depth:	0.589 Ft.
Segment Velocity:	0.673 Ft./Sec.
Segment Flow:	0.923 MGD
Incremental Flow:	0.325 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	UT HAZEL RIVER

Tributary Flow Information

Flow:	0.06 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.397 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.8 miles
Upstream Drainage Area:	84 Sq.Mi.
Downstream Drainage Area:	89 Sq.Mi.
Upstream Elevation:	400 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	3.601 Ft.
Segment Depth:	0.605 Ft.
Segment Velocity:	0.696 Ft./Sec.
Segment Flow:	0.983 MGD
Incremental Flow:	0.065 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	UT HAZEL RIVER

Tributary Flow Information

Flow:	0.103 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.407 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	3.7 miles
Upstream Drainage Area:	89 Sq.Mi.
Downstream Drainage Area:	110 Sq.Mi.
Upstream Elevation:	360 Ft.
Downstream Elevation:	340 Ft.

Hydraulic Information

Segment Width:	7.999 Ft.
Segment Depth:	0.348 Ft.
Segment Velocity:	0.446 Ft./Sec.
Segment Flow:	1.086 MGD
Incremental Flow:	0.274 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

modout
"Model Run For U:\Water Permits\VPDES Program\Facility Archive\Boston Water & Sewer
STP(VA0088749)\2005 Permit Reissuance\Regional\Boston W_S_5_3_68_low_150000.mod on 12/5/2005
11:18:33 AM"

"Model is for HAZEL RIVER."

"Model starts at the BOSTON WATER & SEWER STP NEW FACILITY discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.7726, 2, 0, 7.391, 25

"Discharge/Tributary Input Data for Segment 1"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.15, 5, 3, 6.8, 25

"Hydraulic Information for Segment 1"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.5, 3.6, .589, .673

"Initial Mix Values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.9226, 7.295, 6.219, 0, 8.216, 25

"Rate Constants for Segment 1. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .629, 4.8, 5.404, .15, .22, 0, 0

"Output for Segment 1"

"Segment starts at BOSTON WATER & SEWER STP NEW FACILITY"

"Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.295, 6.219, 0
.1, .1, 7.305, 6.184, 0
.2, .2, 7.314, 6.149, 0
.3, .3, 7.323, 6.114, 0
.4, .4, 7.332, 6.079, 0
.5, .5, 7.341, 6.044, 0
.6, .6, 7.349, 6.01, 0
.7, .7, 7.357, 5.976, 0
.8, .8, 7.365, 5.942, 0
.9, .9, 7.373, 5.908, 0
1, 1, 7.381, 5.874, 0
1.1, 1.1, 7.388, 5.841, 0
1.2, 1.2, 7.394, 5.808, 0
1.3, 1.3, 7.394, 5.775, 0
1.4, 1.4, 7.394, 5.742, 0
1.5, 1.5, 7.394, 5.709, 0
1.6, 1.6, 7.394, 5.676, 0
1.7, 1.7, 7.394, 5.644, 0
1.8, 1.8, 7.394, 5.612, 0
1.9, 1.9, 7.394, 5.58, 0
2, 2, 7.394, 5.548, 0
2.1, 2.1, 7.394, 5.516, 0
2.2, 2.2, 7.394, 5.485, 0
2.3, 2.3, 7.394, 5.454, 0
2.4, 2.4, 7.394, 5.423, 0
2.5, 2.5, 7.394, 5.392, 0

"Discharge/Tributary Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.06, 2, 0, 7.397, 25

"Incremental Flow Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.325, 2, 0, 7.402, 25

"Hydraulic Information for Segment 2"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
4.8, 3.601, .605, .696

"Initial Mix values for Segment 2"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"

1.3076, 7.396, 5.277, 0, 8.224, 25 modout

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .629, 5, 5.629, .15, .22, 0, 0

"Output for Segment 2"

"Segment starts at UT HAZEL RIVER"

"Total", "Segm."

Dist.	Dist.	DO	cBOD	nBOD
(mi)	(mi)	(mg/l)	(mg/l)	(mg/l)
2.5,	0,	7.396,	5.277,	0
2.6,	.1,	7.402,	5.248,	0
2.7,	.2,	7.402,	5.219,	0
2.8,	.3,	7.402,	5.19,	0
2.9,	.4,	7.402,	5.161,	0
3,	.5,	7.402,	5.133,	0
3.1,	.6,	7.402,	5.105,	0
3.2,	.7,	7.402,	5.077,	0
3.3,	.8,	7.402,	5.049,	0
3.4,	.9,	7.402,	5.021,	0
3.5,	1,	7.402,	5,	0
3.6,	1.1,	7.402,	5,	0
3.7,	1.2,	7.402,	5,	0
3.8,	1.3,	7.402,	5,	0
3.9,	1.4,	7.402,	5,	0
4,	1.5,	7.402,	5,	0
4.1,	1.6,	7.402,	5,	0
4.2,	1.7,	7.402,	5,	0
4.3,	1.8,	7.402,	5,	0
4.4,	1.9,	7.402,	5,	0
4.5,	2,	7.402,	5,	0
4.6,	2.1,	7.402,	5,	0
4.7,	2.2,	7.402,	5,	0
4.8,	2.3,	7.402,	5,	0
4.9,	2.4,	7.402,	5,	0
5,	2.5,	7.402,	5,	0
5.1,	2.6,	7.402,	5,	0
5.2,	2.7,	7.402,	5,	0
5.3,	2.8,	7.402,	5,	0
5.4,	2.9,	7.402,	5,	0
5.5,	3,	7.402,	5,	0
5.6,	3.1,	7.402,	5,	0
5.7,	3.2,	7.402,	5,	0
5.8,	3.3,	7.402,	5,	0
5.9,	3.4,	7.402,	5,	0
6,	3.5,	7.402,	5,	0
6.1,	3.6,	7.402,	5,	0
6.2,	3.7,	7.402,	5,	0
6.3,	3.8,	7.402,	5,	0
6.4,	3.9,	7.402,	5,	0
6.5,	4,	7.402,	5,	0
6.6,	4.1,	7.402,	5,	0
6.7,	4.2,	7.402,	5,	0
6.8,	4.3,	7.402,	5,	0
6.9,	4.4,	7.402,	5,	0
7,	4.5,	7.402,	5,	0
7.1,	4.6,	7.402,	5,	0
7.2,	4.7,	7.402,	5,	0
7.3,	4.8,	7.402,	5,	0

"Discharge/Tributary Input Data for Segment 3"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.103, 2, 0, ,7.407, 25

"Incremental Flow Input Data for Segment 3"
"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.065, 2, 0, ,7.41, 25

"Hydraulic Information for Segment 3"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
3.7, 7.999, .348, .446

"Initial Mix Values for Segment 3"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.4756, 7.403, 5, 0, 8.233, 25

modout
"Rate Constants for Segment 3. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, 1.258, 3.243, 3.652, .35, .514, 0, 0

"Output for Segment 3"
"Segment starts at UT HAZEL RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
7.3, 0, 7.403, 5, 0
7.4, .1, 7.41, 5, 0
7.5, .2, 7.41, 5, 0
7.6, .3, 7.41, 5, 0
7.7, .4, 7.41, 5, 0
7.8, .5, 7.41, 5, 0
7.9, .6, 7.41, 5, 0
8, .7, 7.41, 5, 0
8.1, .8, 7.41, 5, 0
8.2, .9, 7.41, 5, 0
8.3, 1, 7.41, 5, 0
8.4, 1.1, 7.41, 5, 0
8.5, 1.2, 7.41, 5, 0
8.6, 1.3, 7.41, 5, 0
8.7, 1.4, 7.41, 5, 0
8.8, 1.5, 7.41, 5, 0
8.9, 1.6, 7.41, 5, 0
9, 1.7, 7.41, 5, 0
9.1, 1.8, 7.41, 5, 0
9.2, 1.9, 7.41, 5, 0
9.3, 2, 7.41, 5, 0
9.4, 2.1, 7.41, 5, 0
9.5, 2.2, 7.41, 5, 0
9.6, 2.3, 7.41, 5, 0
9.7, 2.4, 7.41, 5, 0
9.8, 2.5, 7.41, 5, 0
9.9, 2.6, 7.41, 5, 0
10, 2.7, 7.41, 5, 0
10.1, 2.8, 7.41, 5, 0
10.2, 2.9, 7.41, 5, 0
10.3, 3, 7.41, 5, 0
10.4, 3.1, 7.41, 5, 0
10.5, 3.2, 7.41, 5, 0
10.6, 3.3, 7.41, 5, 0
10.7, 3.4, 7.41, 5, 0
10.8, 3.5, 7.41, 5, 0
10.9, 3.6, 7.41, 5, 0
11, 3.7, 7.41, 5, 0

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

File Information

File Name: U:\Water Permits\Regional\Boston W_S_5_3_68_low_250000.mod
Date Modified: November 30, 2005

Water Quality Standards Information

Stream Name: HAZEL RIVER
River Basin: Rappahannock River Basin
Section: 4
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: 01663500
Gauge Drainage Area: 287 Sq.Mi.
Gauge 7Q10 Flow: 3.748 MGD
Headwater Drainage Area: 59.159 Sq.Mi.
Headwater 7Q10 Flow: 0.7725712 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 1.305923E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.391394 mg/l

Model Segmentation

Number of Segments: 3
Model Start Elevation: 420 ft above MSL
Model End Elevation: 340 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	BOSTON WATER & SEWER STP NEW FACILITY
VPDES Permit No.:	VA0088749

Discharger Flow Information

Flow:	0.25 MGD
cBOD5:	5 mg/l
TKN:	3 mg/l
D.O.:	6.8 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.5 miles
Upstream Drainage Area:	59.159 Sq.Mi.
Downstream Drainage Area:	84 Sq.Mi.
Upstream Elevation:	420 Ft.
Downstream Elevation:	400 Ft.

Hydraulic Information

Segment Width:	4.799 Ft.
Segment Depth:	0.508 Ft.
Segment Velocity:	0.648 Ft./Sec.
Segment Flow:	1.023 MGD
Incremental Flow:	0.325 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	UT HAZEL RIVER

Tributary Flow Information

Flow:	0.06 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.397 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	4.8 miles
Upstream Drainage Area:	84 Sq.Mi.
Downstream Drainage Area:	89 Sq.Mi.
Upstream Elevation:	400 Ft.
Downstream Elevation:	360 Ft.

Hydraulic Information

Segment Width:	4.8 Ft.
Segment Depth:	0.508 Ft.
Segment Velocity:	0.662 Ft./Sec.
Segment Flow:	1.083 MGD
Incremental Flow:	0.065 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Ripple:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UT HAZEL RIVER

Tributary Flow Information

Flow: 0.103 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.407 mg/l
Temperature: 25 Degrees C

Geographic Information

Segment Length: 3.7 miles
Upstream Drainage Area: 89 Sq.Mi.
Downstream Drainage Area: 110 Sq.Mi.
Upstream Elevation: 360 Ft.
Downstream Elevation: 340 Ft.

Hydraulic Information

Segment Width: 9.499 Ft.
Segment Depth: 0.327 Ft.
Segment Velocity: 0.432 Ft./Sec.
Segment Flow: 1.186 MGD
Incremental Flow: 0.274 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Ripple: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout
"Model Run For U:\Water Permits\Regional\Boston W_S_5_3_68_low_250000.mod On
11/30/2005 9:45:09 AM"

"Model is for HAZEL RIVER."

"Model starts at the BOSTON WATER & SEWER STP NEW FACILITY discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.7726, 2, 0, 7.391, 25

"Discharge/Tributary Input Data for Segment 1"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.25, 5, 3, 6.8, 25

"Hydraulic Information for Segment 1"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.5, 4.799, .508, .648

"Initial Mix values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.0226, 7.247, 6.834, 0, 8.216, 25

"Rate Constants for Segment 1. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .629, 4.8, 5.404, .15, .22, 0, 0

"Output for Segment 1"

"Segment starts at BOSTON WATER & SEWER STP NEW FACILITY"

"Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.247, 6.834, 0
.1, .1, 7.256, 6.794, 0
.2, .2, 7.265, 6.754, 0
.3, .3, 7.273, 6.714, 0
.4, .4, 7.281, 6.674, 0
.5, .5, 7.289, 6.635, 0
.6, .6, 7.297, 6.596, 0
.7, .7, 7.305, 6.557, 0
.8, .8, 7.312, 6.518, 0
.9, .9, 7.319, 6.479, 0
1, 1, 7.326, 6.441, 0
1.1, 1.1, 7.333, 6.403, 0
1.2, 1.2, 7.34, 6.365, 0
1.3, 1.3, 7.347, 6.327, 0
1.4, 1.4, 7.354, 6.29, 0
1.5, 1.5, 7.361, 6.253, 0
1.6, 1.6, 7.367, 6.216, 0
1.7, 1.7, 7.373, 6.179, 0
1.8, 1.8, 7.379, 6.142, 0
1.9, 1.9, 7.385, 6.106, 0
2, 2, 7.391, 6.07, 0
2.1, 2.1, 7.394, 6.034, 0
2.2, 2.2, 7.394, 5.998, 0
2.3, 2.3, 7.394, 5.963, 0
2.4, 2.4, 7.394, 5.928, 0
2.5, 2.5, 7.394, 5.893, 0

modout

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.06, 2, 0, 7.397, 25

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.325, 2, 0, 7.402, 25

"Hydraulic Information for Segment 2"
"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
4.8, 4.8, .508, .662

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.4076, 7.396, 5.649, 0, 8.224, 25

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .629, 5, 5.629, .15, .22, 0, 0

"Output for Segment 2"
"Segment starts at UT HAZEL RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
2.5, 0, 7.396, 5.649, 0
2.6, .1, 7.402, 5.616, 0
2.7, .2, 7.402, 5.583, 0
2.8, .3, 7.402, 5.551, 0
2.9, .4, 7.402, 5.519, 0
3, .5, 7.402, 5.487, 0
3.1, .6, 7.402, 5.455, 0
3.2, .7, 7.402, 5.423, 0
3.3, .8, 7.402, 5.392, 0
3.4, .9, 7.402, 5.361, 0
3.5, 1, 7.402, 5.33, 0
3.6, 1.1, 7.402, 5.299, 0
3.7, 1.2, 7.402, 5.268, 0
3.8, 1.3, 7.402, 5.237, 0
3.9, 1.4, 7.402, 5.207, 0
4, 1.5, 7.402, 5.177, 0
4.1, 1.6, 7.402, 5.147, 0
4.2, 1.7, 7.402, 5.117, 0
4.3, 1.8, 7.402, 5.087, 0
4.4, 1.9, 7.402, 5.058, 0
4.5, 2, 7.402, 5.029, 0
4.6, 2.1, 7.402, 5, 0
4.7, 2.2, 7.402, 5, 0
4.8, 2.3, 7.402, 5, 0
4.9, 2.4, 7.402, 5, 0
5, 2.5, 7.402, 5, 0
5.1, 2.6, 7.402, 5, 0
5.2, 2.7, 7.402, 5, 0
5.3, 2.8, 7.402, 5, 0
5.4, 2.9, 7.402, 5, 0
5.5, 3, 7.402, 5, 0
5.6, 3.1, 7.402, 5, 0

				modout
5.7,	3.2,	7.402,	5,	0
5.8,	3.3,	7.402,	5,	0
5.9,	3.4,	7.402,	5,	0
6,	3.5,	7.402,	5,	0
6.1,	3.6,	7.402,	5,	0
6.2,	3.7,	7.402,	5,	0
6.3,	3.8,	7.402,	5,	0
6.4,	3.9,	7.402,	5,	0
6.5,	4,	7.402,	5,	0
6.6,	4.1,	7.402,	5,	0
6.7,	4.2,	7.402,	5,	0
6.8,	4.3,	7.402,	5,	0
6.9,	4.4,	7.402,	5,	0
7,	4.5,	7.402,	5,	0
7.1,	4.6,	7.402,	5,	0
7.2,	4.7,	7.402,	5,	0
7.3,	4.8,	7.402,	5,	0

"Discharge/Tributary Input Data for Segment 3"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .103, 2, 0, ,7.407, 25

"Incremental Flow Input Data for Segment 3"
 "Flow", "CBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .065, 2, 0, ,7.41, 25

"Hydraulic Information for Segment 3"
 "Length", "width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 3.7, 9.499, .327, .432

"Initial Mix values for Segment 3"
 "Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.5756, 7.403, 5, 0, 8.233, 25

"Rate Constants for Segment 3. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1, 1.258, 3.243, 3.652, .35, .514, 0, 0

"Output for Segment 3"
 "Segment starts at UT HAZEL RIVER"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "CBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 7.3, 0, 7.403, 5, 0
 7.4, .1, 7.41, 5, 0
 7.5, .2, 7.41, 5, 0
 7.6, .3, 7.41, 5, 0
 7.7, .4, 7.41, 5, 0
 7.8, .5, 7.41, 5, 0
 7.9, .6, 7.41, 5, 0
 8, .7, 7.41, 5, 0
 8.1, .8, 7.41, 5, 0
 8.2, .9, 7.41, 5, 0
 8.3, 1, 7.41, 5, 0
 8.4, 1.1, 7.41, 5, 0
 8.5, 1.2, 7.41, 5, 0

				modout
8.6,	1.3,	7.41,	5,	0
8.7,	1.4,	7.41,	5,	0
8.8,	1.5,	7.41,	5,	0
8.9,	1.6,	7.41,	5,	0
9,	1.7,	7.41,	5,	0
9.1,	1.8,	7.41,	5,	0
9.2,	1.9,	7.41,	5,	0
9.3,	2,	7.41,	5,	0
9.4,	2.1,	7.41,	5,	0
9.5,	2.2,	7.41,	5,	0
9.6,	2.3,	7.41,	5,	0
9.7,	2.4,	7.41,	5,	0
9.8,	2.5,	7.41,	5,	0
9.9,	2.6,	7.41,	5,	0
10,	2.7,	7.41,	5,	0
10.1,	2.8,	7.41,	5,	0
10.2,	2.9,	7.41,	5,	0
10.3,	3,	7.41,	5,	0
10.4,	3.1,	7.41,	5,	0
10.5,	3.2,	7.41,	5,	0
10.6,	3.3,	7.41,	5,	0
10.7,	3.4,	7.41,	5,	0
10.8,	3.5,	7.41,	5,	0
10.9,	3.6,	7.41,	5,	0
11,	3.7,	7.41,	5,	0

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

File Information

File Name: C:\Program Files\Regional\Boston W_S_3_3_7_2_low.mod
Date Modified: November 29, 2005
450,000

Water Quality Standards Information

Stream Name: HAZEL RIVER
River Basin: Rappahannock River Basin
Section: 4
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: 01663500
Gauge Drainage Area: 287 Sq.Mi.
Gauge 7Q10 Flow: 3.748 MGD
Headwater Drainage Area: 59.159 Sq.Mi.
Headwater 7Q10 Flow: 0.7725712 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 1.305923E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 25 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.391394 mg/l

Model Segmentation

Number of Segments: 3
Model Start Elevation: 420 ft above MSL
Model End Elevation: 340 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	BOSTON WATER & SEWER STP NEW FACILITY
VPDES Permit No.:	VA0088749

Discharger Flow Information

Flow:	0.45 MGD
cBOD5:	3 mg/l
TKN:	3 mg/l
D.O.:	7.2 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	2.5 miles
Upstream Drainage Area:	59.159 Sq.Mi.
Downstream Drainage Area:	84 Sq.Mi.
Upstream Elevation:	420 Ft.
Downstream Elevation:	400 Ft.

Hydraulic Information

Segment Width:	10.801 Ft.
Segment Depth:	0.4 Ft.
Segment Velocity:	0.531 Ft./Sec.
Segment Flow:	1.223 MGD
Incremental Flow:	0.325 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UT HAZEL RIVER

Tributary Flow Information

Flow: 0.06 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.397 mg/l
Temperature: 25 Degrees C

Geographic Information

Segment Length: 4.8 miles
Upstream Drainage Area: 84 Sq.Mi.
Downstream Drainage Area: 89 Sq.Mi.
Upstream Elevation: 400 Ft.
Downstream Elevation: 360 Ft.

Hydraulic Information

Segment Width: 10.8 Ft.
Segment Depth: 0.318 Ft.
Segment Velocity: 0.529 Ft./Sec.
Segment Flow: 1.283 MGD
Incremental Flow: 0.065 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Ripple: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to HAZEL RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UT HAZEL RIVER

Tributary Flow Information

Flow: 0.103 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.407 mg/l
Temperature: 25 Degrees C

Geographic Information

Segment Length: 3.7 miles
Upstream Drainage Area: 89 Sq.Mi.
Downstream Drainage Area: 110 Sq.Mi.
Upstream Elevation: 360 Ft.
Downstream Elevation: 340 Ft.

Hydraulic Information

Segment Width: 20 Ft.
Segment Depth: 0.4 Ft.
Segment Velocity: 0.345 Ft./Sec.
Segment Flow: 1.386 MGD
Incremental Flow: 0.274 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout.txt

"Model Run For C:\Program Files\Regional\Boston w_s_3_3_7_2_low.mod on 11/29/2005
1:59:40 PM"

"Model is for HAZEL RIVER."
 "Model starts at the BOSTON WATER & SEWER STP NEW FACILITY discharge."

"Background Data"
 "7Q10", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .7726, 2, 0, 7.391, 25

"Discharge/Tributary Input Data for Segment 1"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .45, 3, 3, 7.2, 25

"Hydraulic Information for Segment 1"
 "Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 2.5, 10.801, .4, .531

"Initial Mix values for Segment 1"
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 1.2226, 7.321, 5.92, 0, 8.216, 25

"Rate Constants for Segment 1. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1, 1.258, 4.8, 5.404, .35, .514, 0, 0

"Output for Segment 1"
 "Segment starts at BOSTON WATER & SEWER STP NEW FACILITY"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 0, 0, 7.321, 5.92, 0
 .1, .1, 7.292, 5.835, 0
 .2, .2, 7.266, 5.751, 0
 .3, .3, 7.243, 5.668, 0
 .4, .4, 7.223, 5.587, 0
 .5, .5, 7.205, 5.507, 0
 .6, .6, 7.189, 5.428, 0
 .7, .7, 7.175, 5.35, 0
 .8, .8, 7.163, 5.273, 0
 .9, .9, 7.153, 5.197, 0
 1, 1, 7.145, 5.122, 0
 1.1, 1.1, 7.138, 5.048, 0
 1.2, 1.2, 7.133, 5, 0
 1.3, 1.3, 7.198, 5, 0
 1.4, 1.4, 7.259, 5, 0
 1.5, 1.5, 7.317, 5, 0
 1.6, 1.6, 7.371, 5, 0
 1.7, 1.7, 7.394, 5, 0
 1.8, 1.8, 7.394, 5, 0
 1.9, 1.9, 7.394, 5, 0
 2, 2, 7.394, 5, 0
 2.1, 2.1, 7.394, 5, 0
 2.2, 2.2, 7.394, 5, 0
 2.3, 2.3, 7.394, 5, 0
 2.4, 2.4, 7.394, 5, 0
 2.5, 2.5, 7.394, 5, 0

modout.txt

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.06, 2, 0, ,7.397, 25

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.325, 2, 0, ,7.402, 25

"Hydraulic Information for Segment 2"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
4.8, 10.8, .318, .529

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.6076, 7.396, 5, 0, 8.224, 25

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, 1.258, 5, 5.629, .35, .514, 0, 0

"Output for Segment 2"
"Segment starts at UT HAZEL RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
2.5, 0, 7.396, 5, 0
2.6, .1, 7.402, 5, 0
2.7, .2, 7.402, 5, 0
2.8, .3, 7.402, 5, 0
2.9, .4, 7.402, 5, 0
3, .5, 7.402, 5, 0
3.1, .6, 7.402, 5, 0
3.2, .7, 7.402, 5, 0
3.3, .8, 7.402, 5, 0
3.4, .9, 7.402, 5, 0
3.5, 1, 7.402, 5, 0
3.6, 1.1, 7.402, 5, 0
3.7, 1.2, 7.402, 5, 0
3.8, 1.3, 7.402, 5, 0
3.9, 1.4, 7.402, 5, 0
4, 1.5, 7.402, 5, 0
4.1, 1.6, 7.402, 5, 0
4.2, 1.7, 7.402, 5, 0
4.3, 1.8, 7.402, 5, 0
4.4, 1.9, 7.402, 5, 0
4.5, 2, 7.402, 5, 0
4.6, 2.1, 7.402, 5, 0
4.7, 2.2, 7.402, 5, 0
4.8, 2.3, 7.402, 5, 0
4.9, 2.4, 7.402, 5, 0
5, 2.5, 7.402, 5, 0
5.1, 2.6, 7.402, 5, 0
5.2, 2.7, 7.402, 5, 0
5.3, 2.8, 7.402, 5, 0
5.4, 2.9, 7.402, 5, 0
5.5, 3, 7.402, 5, 0
5.6, 3.1, 7.402, 5, 0

modout.txt

5.7,	3.2,	7.402,	5,	0
5.8,	3.3,	7.402,	5,	0
5.9,	3.4,	7.402,	5,	0
6,	3.5,	7.402,	5,	0
6.1,	3.6,	7.402,	5,	0
6.2,	3.7,	7.402,	5,	0
6.3,	3.8,	7.402,	5,	0
6.4,	3.9,	7.402,	5,	0
6.5,	4,	7.402,	5,	0
6.6,	4.1,	7.402,	5,	0
6.7,	4.2,	7.402,	5,	0
6.8,	4.3,	7.402,	5,	0
6.9,	4.4,	7.402,	5,	0
7,	4.5,	7.402,	5,	0
7.1,	4.6,	7.402,	5,	0
7.2,	4.7,	7.402,	5,	0
7.3,	4.8,	7.402,	5,	0

"Discharge/Tributary Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.103, 2, 0, 7.407, 25

"Incremental Flow Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.065, 2, 0, 7.41, 25

"Hydraulic Information for Segment 3"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
3.7, 20, .4, .345

"Initial Mix Values for Segment 3"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.7756, 7.403, 5, 0, 8.233, 25

"Rate Constants for Segment 3. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, 1.258, 3.243, 3.652, .35, .514, 0, 0

"Output for Segment 3"
"Segment starts at UT HAZEL RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
7.3, 0, 7.403, 5, 0
7.4, .1, 7.41, 5, 0
7.5, .2, 7.41, 5, 0
7.6, .3, 7.41, 5, 0
7.7, .4, 7.41, 5, 0
7.8, .5, 7.41, 5, 0
7.9, .6, 7.41, 5, 0
8, .7, 7.41, 5, 0
8.1, .8, 7.41, 5, 0
8.2, .9, 7.41, 5, 0
8.3, 1, 7.41, 5, 0
8.4, 1.1, 7.41, 5, 0
8.5, 1.2, 7.41, 5, 0

modout.txt

8.6,	1.3,	7.41,	5,	0
8.7,	1.4,	7.41,	5,	0
8.8,	1.5,	7.41,	5,	0
8.9,	1.6,	7.41,	5,	0
9,	1.7,	7.41,	5,	0
9.1,	1.8,	7.41,	5,	0
9.2,	1.9,	7.41,	5,	0
9.3,	2,	7.41,	5,	0
9.4,	2.1,	7.41,	5,	0
9.5,	2.2,	7.41,	5,	0
9.6,	2.3,	7.41,	5,	0
9.7,	2.4,	7.41,	5,	0
9.8,	2.5,	7.41,	5,	0
9.9,	2.6,	7.41,	5,	0
10,	2.7,	7.41,	5,	0
10.1,	2.8,	7.41,	5,	0
10.2,	2.9,	7.41,	5,	0
10.3,	3,	7.41,	5,	0
10.4,	3.1,	7.41,	5,	0
10.5,	3.2,	7.41,	5,	0
10.6,	3.3,	7.41,	5,	0
10.7,	3.4,	7.41,	5,	0
10.8,	3.5,	7.41,	5,	0
10.9,	3.6,	7.41,	5,	0
11,	3.7,	7.41,	5,	0

"END OF FILE"

modout.txt

"***SEASONAL RUN***"

"Wet Season is from December to May."

"Model Run For C:\Program Files\Regional\Boston w_s_10_6_6.mod On 7/14/2005 7:30:47 AM"

"Model is for HAZEL RIVER."

"Model starts at the BOSTON WATER & SEWER STP NEW FACILITY discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
6.9259, 2, 0, 8.922, 15

"Discharge/Tributary Input Data for Segment 1"

"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.45, 30, 10, ,6, 25

"Hydraulic Information for Segment 1"

"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.5, 10.801, 1.793738, .5890602

"Initial Mix Values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
7.3759, 8.743, 9.271, 1.849, 9.788, 15.61009

"Rate Constants for Segment 1. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .409, 4.8, 4.325, .15, .107, 0, 0

"Output for Segment 1"

"Segment starts at BOSTON WATER & SEWER STP NEW FACILITY"

"Total", "Segm."

"Dist.", "Dist:", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"

0,	0,	8.743,	9.271,	1.849
.1,	.1,	8.748,	9.232,	1.847
.2,	.2,	8.753,	9.193,	1.845
.3,	.3,	8.758,	9.154,	1.843
.4,	.4,	8.763,	9.115,	1.841
.5,	.5,	8.768,	9.076,	1.839
.6,	.6,	8.773,	9.038,	1.837
.7,	.7,	8.778,	9,	1.835
.8,	.8,	8.783,	8.962,	1.833
.9,	.9,	8.788,	8.924,	1.831
1,	1,	8.793,	8.886,	1.829
1.1,	1.1,	8.798,	8.848,	1.827
1.2,	1.2,	8.803,	8.811,	1.825
1.3,	1.3,	8.808,	8.774,	1.823
1.4,	1.4,	8.809,	8.737,	1.821
1.5,	1.5,	8.809,	8.7,	1.819
1.6,	1.6,	8.809,	8.663,	1.817
1.7,	1.7,	8.809,	8.626,	1.815
1.8,	1.8,	8.809,	8.59,	1.813
1.9,	1.9,	8.809,	8.554,	1.811
2,	2,	8.809,	8.518,	1.809
2.1,	2.1,	8.809,	8.482,	1.807
2.2,	2.2,	8.809,	8.446,	1.805
2.3,	2.3,	8.809,	8.41,	1.803
2.4,	2.4,	8.809,	8.374,	1.801
2.5,	2.5,	8.809,	8.339,	1.799

modout.txt

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.5379, 2, 0, ,8.934, 15

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
2.913554, 2, 0, ,8.855, 15

"Hydraulic Information for Segment 2"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
4.8, 10.8, .318, .529

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
10.8274, 8.828, 7.275, 1.226, 9.839, 15.41561

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, .81, 5, 4.485, .35, .246, 0, 0

"Output for Segment 2"
"Segment starts at UT HAZEL RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
2.5, 0, 8.828, 7.275, 1.226
2.6, .1, 8.81, 7.207, 1.223
2.7, .2, 8.793, 7.14, 1.22
2.8, .3, 8.778, 7.073, 1.217
2.9, .4, 8.764, 7.007, 1.214
3, .5, 8.751, 6.942, 1.211
3.1, .6, 8.74, 6.877, 1.208
3.2, .7, 8.73, 6.813, 1.205
3.3, .8, 8.721, 6.75, 1.202
3.4, .9, 8.713, 6.687, 1.199
3.5, 1, 8.706, 6.625, 1.196
3.6, 1.1, 8.7, 6.563, 1.193
3.7, 1.2, 8.695, 6.502, 1.19
3.8, 1.3, 8.69, 6.441, 1.187
3.9, 1.4, 8.686, 6.381, 1.184
4, 1.5, 8.683, 6.322, 1.181
4.1, 1.6, 8.681, 6.263, 1.178
4.2, 1.7, 8.679, 6.205, 1.175
4.3, 1.8, 8.678, 6.147, 1.172
4.4, 1.9, 8.678, 6.09, 1.169
4.5, 2, 8.678, 6.033, 1.166
4.6, 2.1, 8.679, 5.977, 1.163
4.7, 2.2, 8.68, 5.921, 1.16
4.8, 2.3, 8.682, 5.866, 1.157
4.9, 2.4, 8.684, 5.811, 1.154
5, 2.5, 8.686, 5.757, 1.151
5.1, 2.6, 8.689, 5.703, 1.148
5.2, 2.7, 8.692, 5.65, 1.145
5.3, 2.8, 8.695, 5.597, 1.142
5.4, 2.9, 8.699, 5.545, 1.139

modout.txt

5.5,	3,	8.703,	5.493,	1.136
5.6,	3.1,	8.707,	5.442,	1.133
5.7,	3.2,	8.712,	5.391,	1.13
5.8,	3.3,	8.717,	5.341,	1.127
5.9,	3.4,	8.722,	5.291,	1.124
6,	3.5,	8.727,	5.242,	1.121
6.1,	3.6,	8.732,	5.193,	1.118
6.2,	3.7,	8.738,	5.145,	1.115
6.3,	3.8,	8.744,	5.097,	1.112
6.4,	3.9,	8.75,	5.05,	1.109
6.5,	4,	8.756,	5.003,	1.106
6.6,	4.1,	8.762,	5,	1.103
6.7,	4.2,	8.813,	5,	1.1
6.8,	4.3,	8.855,	5,	1.097
6.9,	4.4,	8.855,	5,	1.094
7,	4.5,	8.855,	5,	1.091
7.1,	4.6,	8.855,	5,	1.088
7.2,	4.7,	8.855,	5,	1.085
7.3,	4.8,	8.855,	5,	1.082

"Discharge/Tributary Input Data for Segment 3"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .9234, 2, 0, 8.944, 15

"Incremental Flow Input Data for Segment 3"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .5827107, 2, 0, 8.874, 15

"Hydraulic Information for Segment 3"
 "Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 3.7, 20, 1.793738, .5319386

"Initial Mix Values for Segment 3"
 "Flow", "DO", "cBOD", "nBOD", "posat", "Temp"
 "(mgo)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 12.3335, 8.863, 5, .95, 9.86, 15.36486

"Rate Constants for Segment 3. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .404, 3.243, .15, .105, 0, 0

"Output for Segment 3"
 "Segment starts at UT HAZEL RIVER"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 7.3, 0, 8.863, 5, .95
 7.4, .1, 8.874, 5, .949
 7.5, .2, 8.874, 5, .948
 7.6, .3, 8.874, 5, .947
 7.7, .4, 8.874, 5, .946
 7.8, .5, 8.874, 5, .945
 7.9, .6, 8.874, 5, .944
 8, .7, 8.874, 5, .943
 8.1, .8, 8.874, 5, .942
 8.2, .9, 8.874, 5, .941
 8.3, 1, 8.874, 5, .94

modout.txt

8.4,	1.1,	8.874,	5,	.939
8.5,	1.2,	8.874,	5,	.938
8.6,	1.3,	8.874,	5,	.937
8.7,	1.4,	8.874,	5,	.936
8.8,	1.5,	8.874,	5,	.935
8.9,	1.6,	8.874,	5,	.934
9,	1.7,	8.874,	5,	.933
9.1,	1.8,	8.874,	5,	.932
9.2,	1.9,	8.874,	5,	.931
9.3,	2,	8.874,	5,	.93
9.4,	2.1,	8.874,	5,	.929
9.5,	2.2,	8.874,	5,	.928
9.6,	2.3,	8.874,	5,	.927
9.7,	2.4,	8.874,	5,	.926
9.8,	2.5,	8.874,	5,	.925
9.9,	2.6,	8.874,	5,	.924
10,	2.7,	8.874,	5,	.923
10.1,	2.8,	8.874,	5,	.922
10.2,	2.9,	8.874,	5,	.921
10.3,	3,	8.874,	5,	.92
10.4,	3.1,	8.874,	5,	.919
10.5,	3.2,	8.874,	5,	.918
10.6,	3.3,	8.874,	5,	.917
10.7,	3.4,	8.874,	5,	.916
10.8,	3.5,	8.874,	5,	.915
10.9,	3.6,	8.874,	5,	.914
11,	3.7,	8.874,	5,	.913

"END OF FILE"

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Culpeper County, Virginia.

PUBLIC COMMENT PERIOD: XXX, 2010 to 5:00 p.m. on XXX, 2010

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Boston Water & Sewer STP, 2301 Wyoming Ave NW, Washington DC 20008, VA0088749

NAME AND ADDRESS OF FACILITY: Boston Water & Sewer STP, 1 mile SSW of the intersection of Routes 522 and 707, Boston VA, 22713

PROJECT DESCRIPTION: Boston Water & Sewer STP has applied for a reissuance of a permit for the private Boston Water & Sewer STP. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of up to 0.45 million gallons per day into a water body. The sludge will be disposed by hauling to an approved facility for further treatment. The facility proposes to release the treated sewage wastewaters in the Hazel River in Culpeper County in the Rappahannock watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: CBOD, BOD, Total Kjeldahl Nitrogen, Total Suspended Solids, Total Residual Chlorine, E. coli, Dissolved Oxygen, Total Nitrogen, Total Phosphorus, and pH. The permit also includes monitoring for toxicity.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Alison Thompson

Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193

Phone: (703) 583-3834 E-mail: Alison.Thompson@deq.virginia.gov Fax: (703) 583-3821

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Boston Water & Sewer STP
NPDES Permit Number: VA0088749
Permit Writer Name: Alison L. Thompson
Date: August 10, 2010

Major [] **Minor** [X] **Industrial** [] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:		Yes	No	N/A
1. Permit Application?		X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?		X		
3. Copy of Public Notice?		X		
4. Complete Fact Sheet?		X		
5. A Priority Pollutant Screening to determine parameters of concern?		X		
6. A Reasonable Potential analysis showing calculated WQBELs?		X		
7. Dissolved Oxygen calculations?		X		
8. Whole Effluent Toxicity Test summary and analysis?				X
9. Permit Rating Sheet for new or modified industrial facilities?				X

I.B. Permit/Facility Characteristics		Yes	No	N/A
1. Is this a new, or currently unpermitted facility?			X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?		X		
3. Does the fact sheet or permit contain a description of the wastewater treatment process?		X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?			X	
5. Has there been any change in streamflow characteristics since the last permit was developed?			X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?			X	
7. Does the fact sheet or permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?		X		
8. Does the facility discharge to a 303(d) listed water?		X		
a. Has a TMDL been developed and approved by EPA for the impaired water?		X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit? APPROVED 1/23/08		X		
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?		X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?			X	
10. Does the permit authorize discharges of storm water?			X	

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?	X		
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs (To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		
II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether “antibacksliding” provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X
II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for <u>ALL</u> of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?	X		
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X
II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?		X	
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a “reasonable potential” evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the “reasonable potential” evaluation was performed in accordance with the State’s approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have “reasonable potential”?	X		
d. Does the fact sheet indicate that the “reasonable potential” and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which “reasonable potential” was determined?	X		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an “antidegradation” review was performed in accordance with the State’s approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

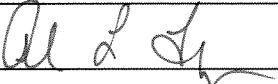
II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the “Nine Minimum Controls”?			X
b. Does the permit require development and implementation of a “Long Term Control Plan”?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions	Yes	No	N/A
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

List of Standard Conditions – 40 CFR 122.41		
Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
Duty to mitigate	Monitoring and records	Transfers
Proper O & M	Signatory requirement	Monitoring reports
Permit actions	Bypass	Compliance schedules
	Upset	24-Hour reporting
		Other non-compliance
2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X	

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	<u>Alison L. Thompson</u>
Title	<u>Water Permits Technical Reviewer</u>
Signature	
Date	<u>8/10/10</u>